

23
April, 2001

DE-9J

CERTIFIED MAIL 7099 3400 0000 9586 7618
RETURN RECEIPT REQUESTED

CT Corporation System
Registered Agent for
EKCO Housewares, Inc.
1300 East Ninth Street
Cleveland, Ohio 44114

RE: Final Decision and Corrective
Measures Implementation Order
EKCO Housewares, Inc.
OHD 045 205 424

Dear Sir/Madam:

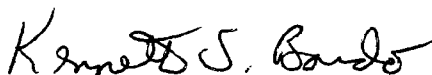
Enclosed are the United States Environmental Protection Agency (U.S. EPA) Final Decision and Response to Comments for the EKCO Housewares, Inc. facility located at 359 State Avenue, Ext. N.W., Massillon, Ohio 44648-0560 and the proposed Administrative Order on Consent (AOC) to implement the selected remedy detailed in the Final Decision.

Administrative Order on Consent, U.S. EPA Docket No. V-W-87-R-08 allows for a 60 day period for negotiation of a new AOC to implement the selected remedy. U.S. EPA is willing to meet as necessary to reach an agreement on a new AOC.

Within seven days of receipt of this letter, please contact me at (312) 886-7566 to set a date for an initial meeting. The meeting should take place within 21 days of receipt of this letter. An agenda should be proposed and submitted to U.S. EPA at least five days before the meeting.

Your cooperation in resolving this matter is appreciated.

Sincerely yours,



Kenneth S. Bardo
Corrective Action Section

Enclosures (2)

cc: Jeffrey Burman, EKCO Housewares, Inc.
Matthew Basso, American Home Products Corporation
C. Richard Springer, Borden, Inc.
Thomas Cornuet, Roy F. Weston, Inc.
Karen Nesbit, Ohio EPA

DE-9J:KBARDO:6-7566:kb:04/16/01

EKCO AOC Transmittal Letter

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Waste, Pesticides and Toxics Division

Type of Document: Streamlined CMI Consent Order

Name of Document (Facility Name & Location):

EKCO Housewares, Inc. located in Massillon, Ohio

EPA ID#: OHD 045 205 424

Originator/Phone: Ken Bardo, 6-7566

NOTE: Originator and first level supervisor are responsible for assuring that documents are in plain language. All other reviewers should consider plain language in their reviews. See the plain language checklist on the reverse side of this sheet.

Date	Name	Secretary/Chief Initials
3/7/01 - KB	Author - Ken Bardo	Ken Bardo
3/8/01 with comments	ECAB Section Chief - George Hamper	Ken Bardo for G.H.
3/12/01	Corrective Action Manager - Gerald Phillips	G.D. Phillips
4/17/01	Asst. Reg. Counsel - Christine Liszewski	C.H. Liszewski
4/17/01	Chief, ORC Section - Debra Klassman	Debra Klassman
4/23/01	ECAB Branch Chief - JMF	JMF
	Robert Springer, Director	
	IL/MI State Coordinator	
	IN/MN State Coordinator	
	OH/WI State Coordinator	
	Congressional/Intergovernmental	
	Relation Officer (AL/ORAC)	
	David Ullrich, Deputy RA	
	Francis X. Lyons	

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(attach official file copy/return w/originator's Copy)

Correction Required _____

REMARKS/COMMENTS _____



Waste, Pesticides and Toxics Division

Type of Document: Final Decision and Response to Comments

Name of Document (FacilityName & Location):

EKCO Housewares, Inc. located in Massillon, Ohio

EPA ID#: OHD 045 205 424

Originator/Phone: Ken Bardo, 6-7566

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Date	Name	Secretary/Chief Initials
3/5/01 - KB	Author - Ken Bardo	Ken Bardo
3-7-01	ECAB Section Chief - George Hamper	George Hamper
3/12/01	Corrective Action Manager - Gerald Phillips	Gerald Phillips
4/17/01	Asst. Reg. Counsel - Christine Liszewski	C. H. Liszewski
4/17/01	Chief, ORC Section - Debra Klappman	Debra Klappman
4/23/01	ECAB Branch Chief - [Signature]	JMB
	Robert Springer, Director	
	IL/MI State Coordinator	
	IN/MN State Coordinator	
	OH/WI State Coordinator	
	Congressional/Intergovernmental	
	Relation Officer (AL/ORAC)	
	David Ullrich, Deputy RA	
	Francis X. Lyons	

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Correction Required _____

REMARKS/COMMENTS _____

**FINAL DECISION AND
RESPONSE TO COMMENTS**

for

**EKCO Housewares, Inc.
Massillon, Ohio
EPA I.D. No. OHD 045 205 424**



April 23, 2001

FINAL DECISION

EKCO HOUSEWARES, INC.
MASSILLON, OHIO
OHD 045 205 424

Introduction

This Final Decision and Response to Comments is presented by the United States Environmental Protection Agency (U.S. EPA) for the EKCO Housewares, Inc. (EKCO) facility located in Massillon, Ohio. It consists of the Final Decision, previously issued Statement of Basis (Attachment I), Response to Comments (Attachment II), and Index to Administrative Record (Attachment III).

This Final Decision selects the final remedy to be implemented at the EKCO facility, based on the Administrative Record and comments received from the public. The Statement of Basis provides the proposed remedy and was available for public review and comment from August 26 through September 26, 1996. A public meeting was held on September 10, 1996. The Response to Comments addresses public concerns raised during the public comment period.

Assessment of the Facility

The response action documented in this Final Decision is necessary to protect human health and the environment.

Selected Remedy

U.S. EPA has selected the following remedial components as the remedy to address contaminated media at the EKCO facility:

- Air sparging of shallow groundwater and collection using soil vapor extraction;
- Extraction of contaminated groundwater in the bedrock aquifer and treatment by air stripping;
- Implementation of a groundwater monitoring program to monitor the shallow and bedrock aquifers at the facility;
- Well permit restrictions;
- Institutional controls to restrict the facility to non-residential use only; and
- Soil vapor extraction to treat contaminated soil.

The remedy selected in this Final Decision is generally the same as the remedy which was proposed in the Statement of Basis, with some modification based on new findings described below and the addition of institutional controls to restrict land use.

Institutional controls are necessary at the EKCO facility because the final remedy will not immediately result in unrestricted use of the land and unlimited exposure at the facility. This remedy provides the best balance among the alternatives with respect to the evaluation criteria described in the Statement of Basis, including:

- Technical (performance, reliability, implementability and safety);
- Overall Protection of Human Health;
- Overall Protection of Environment; and
- Institutional.

Public Participation Activities and Comments

On September 10, 1996, U.S. EPA held a public meeting at the Massillon Municipal Center located at 1 James Duncan Plaza, in Massillon, Ohio to present the Statement of Basis and accept oral comments. No comments were offered during the public meeting.

A thirty (30) day public comment period was held from August 26, 1996 through September 26, 1996. American Home Products Corporation (AHPC) and Consumers Ohio Water Company (COWC) submitted written comments. AHPC agreed with the proposed remedy and provided comments on matters not affecting the proposed remedy. COWC of Massillon, Ohio expressed concern over groundwater flow in the area of the EKCO facility.

New Findings

On February 29, 2000, U.S. EPA met with EKCO facility representatives. EKCO proposed additional soil sampling activities to determine if soil vapor extraction was still necessary to address risks associated with soil contamination. EKCO believed that in the nine years since soil was last sampled, contaminant concentrations in soil might have decreased below the identified soil cleanup goals.

A recent soil sampling program confirmed that certain areas of contaminated soil still require the proposed soil vapor extraction remedy component to protect human health and the environment. However, the areas requiring soil vapor extraction

as described in the CMS Report, have been modified based on these new findings. New soil cleanup goals have also been identified based on more recent EPA Soil Screening Guidance (May 1996). The Administrative Record has been updated to include all documents associated with these new findings.

Administrative Record

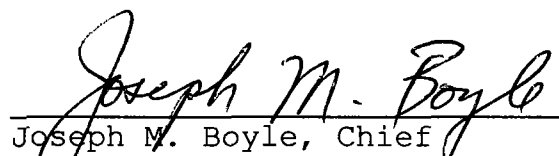
The Administrative Record upon which the final remedy was selected is available at the Massillon Public Library and the 7th Floor Records Center at the U.S. EPA, Region 5 office. Attachment III identifies the documents contained within the Administrative Record.

Future Actions

The U.S. EPA is required to provide a sixty (60) day period for negotiation of a new Administrative Order on Consent for implementation of the selected remedy. U.S. EPA will send a draft Administrative Order on Consent to EKCO concurrently with the signing of this Final Decision. During the remedy implementation period, U.S. EPA will provide further information to the public as deemed appropriate and upon request.

Declarations

Based on the Administrative Record compiled for this corrective action, U.S. EPA has determined that the selected remedy for the EKCO facility is appropriate and protective of human health and the environment.



Joseph M. Boyle, Chief
Enforcement & Compliance Assurance Branch
U.S. EPA, Region 5



Date

Attachments (3)

IN THE MATTER OF:

EKCO Housewares, Inc.
Massillon, Ohio
U.S. EPA I.D. No. OHD 045 205 424

RCRA RECORD OF DECISION

FINAL DECISION AND RESPONSE TO COMMENTS SELECTION OF REMEDIAL ALTERNATIVE

**EKCO HOUSEWARES, INCORPORATED
MASSILLON, OHIO
OHD 045 205 424**

Introduction

This RCRA Record of Decision (ROD) is presented by the United States Environmental Protection Agency (U.S. EPA) for the EKCO Housewares, Incorporated, (EKCO) facility located in Massillon, Ohio. It consists of the previously issued Statement of Basis (Attachment I), Response To Comments (Attachment II) and the Final Decision. The Statement of Basis provided the proposed remedy and was made available for public review and comment from August 26, 1996 until September 26, 1996. This ROD supports the proposed remedy based on the Administrative Record.

Assessment of the Site

The action documented in this RCRA ROD is necessary to protect human health and the environment.

Selected Remedy

U.S. EPA has selected the following remedial components as the remedy to address contaminated media at the EKCO facility:

- . Air sparging and groundwater extraction and treatment
- . Groundwater monitoring
- . Well permit restrictions, and
- . Soil vapor extraction

Public Participation Activities

The Statement of Basis (SB) and the supporting Administrative Record were placed in the public library in Massillon, Ohio and the U.S. EPA, Region 5, Waste, Pesticides, Toxics Division Records Center for public review prior to the start of the public comment period. The public comment period started on August 26, 1996 and continued until September 26, 1996. The public comment period and public meeting were announced through a newspaper advertisement and a press release. The public meeting was held on September 10, 1996, at the Massillon Municipal Center, 1 James Duncan Plaza, Massillon, Ohio.

Public Comments and Concerns

No comments were offered during the public meeting, however, American Home Products Corporation (AHPC) and Consumers Ohio Water Company (COWC) submitted written comments. American Home Products Corporation agrees with the proposed remedy but provided comments on matters not affecting the proposed remedy. Consumers Ohio Water Company of Massillon, Ohio, expressed concern over groundwater flow in the area of the EKCO facility.

Administrative Record

The Administrative Record upon which the final remedy was selected is available at the public library in Massillon, Ohio and the Waste, Pesticides and Toxics Division Records Center of the U.S. EPA, Region 5 offices. Attachment III identifies the documents contained within the Administrative Record.

Future Actions

The U.S. EPA plans to issue an Administrative Order or modify the existing Consent Order to require AHPC to implement the selected remedy at the facility.

Declarations

Based upon the Administrative Record compiled for this corrective action, U.S. EPA has determined that the selected remedy is appropriate and is protective of human health and the environment.

ROBERT SPRINGER
DIRECTOR
WASTE, PESTICIDES AND TOXICS DIVISION
U.S. EPA, REGION 5

DATE

Attachments

IN THE MATTER OF:

EKCO Housewares, Incorporated
Massillon, Ohio
U.S. EPA I.D. # OHD 045 205 424

ATTACHMENT I
STATEMENT OF BASIS

**PROPOSED STATEMENT OF BASIS
FOR
EKCO HOUSEWARES, INCORPORATED
MASSILLON, OHIO
OHD 045 205 424**

**U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION V**

APRIL 1996

**Cleveland*

INTRODUCTION

This Statement of Basis (SB) for Ekco Housewares, Incorporated (Ekco) explains the proposed remedy for cleaning up the contaminated soil and ground water at the Ekco Housewares facility. In addition, the SB includes summaries of other remedies analyzed for this facility. United States Environmental Protection Agency (U.S. EPA) will select a final remedy for the facility only after the public comment period has ended and the information submitted during this time has been reviewed and considered.

U.S. EPA is issuing this SB as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). This document summarizes information that can be found in greater detail in the RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS) reports and other documents contained in the administrative record for this facility. U.S. EPA encourages the public to review these other documents in order to gain a more comprehensive understanding of the facility and RCRA activities that have been conducted there.

U.S. EPA may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on all alternatives. The public can be involved in the remedy selection process by reviewing the documents contained in the administrative record file and attending the public meeting.

PROPOSED REMEDY

The proposed remedy consists of the following components:

- . Air sparging and groundwater extraction and treatment
- . Groundwater monitoring
- . Well permit restrictions, and
- . Soil vapor extraction

The proposed remedy will be explained in greater detail later in this document. Closure of the lagoon/surface impoundment has addressed the contamination of soils. Groundwater and other soil issues are being addressed with on-going groundwater monitoring and proposed remediation activities.

FACILITY BACKGROUND

FACILITY INVESTIGATION

The Ekco facility is located on approximately 13 acres in the town of Massillon, Stark County, Ohio. The area surrounding the facility is largely urban and industrial. Land use to the northwest

is more rural with a large proportion of open space. The Ekco property is triangular in shape and lies an estimated 1,500 feet west of the Tuscarawas River (Figure 1.1). The facility is bordered to the north by Newman Creek, while a railroad borders the EKCO property to the west and east, respectively. A map of the facility is shown in Figure 1.2.

OPERATIONS BACKGROUND

In the 1940's, the EKCO facility in Massillon manufactured aluminum and stainless steel cookware. By 1951 the plant began manufacturing shell casings for the military. The increased production led to the drilling of two production wells (W-1 and W-2, see Figure 1.2) at the facility. In 1953, a sewer was constructed to carry plant waste to a discharge point along the Newman Creek. At approximately the same time, a lagoon/surface impoundment was constructed along the northern property boundary adjacent to Newman Creek. Sludge resulting from waste treatment activities and waste associated with plant activities was discharged to the surface impoundment. The waste included: hydrochloric acid and sodium hydroxide from copper coating, aluminum frit, various pigments, degreaser filter water, inorganic metal oxides from porcelain/Teflon coating, and alkaline washer fluids from aluminum cookware processing. The surface impoundment was used from approximately from 1953 to 1977, and then from 1980 until 1984.

During 1954, EKCO began coating cookware manufactured at the facility. From 1954 to 1960, Ekco used solvents, primarily trichloroethylene (TCE) or 1,1,1-trichloroethane (1,1,1-TCA) in their cleaning process prior to coating. The use of TCE was reinitiated from 1980 to the present. Porcelain and Teflon coating units were installed in 1967.

Between 1979 and 1980, a major solvent spill of unknown quantity occurred near process water well W-10 (see Figure 1.2). Neither the exact location nor the extent of the spill was documented. A second spill of 50 gallons of 1,1,1-TCA was reported to have occurred in 1992 on the west side of the building.

In 1984, an analysis of the on-site well water was conducted for volatile organic compounds (VOCs). The results indicated the presence of TCE and 1,1,1-TCA. A number of activities were conducted at the facility including a groundwater quality assessment, RCRA facility investigation (RFI), corrective measures study (CMS) and interim measures reports to identify the types, quantities, and locations of contaminants and to develop ways of addressing the contamination problems. The results of these studies are as follows:

- VOCs were detected in shallow, intermediate and bedrock groundwater monitoring wells.

- A nearby municipal well was contaminated.

VOC source areas were identified in four locations such as the areas in the southwestern end of the plant, tank area at the northern end of the plant and in a sump at production well W-10 (Figure 1.3).

PREVIOUS ENVIRONMENTAL INVESTIGATIONS

A summary of the previous environmental investigative activities conducted at the EKCO facility is presented in Table 1. EKCO initiated an environmental investigation in 1984, with the discovery of 1,1,1-TCA and TCE in the groundwater production wells. During the months of September and October of 1984, seven test borings were drilled. Four test borings (TH-1-84 through TH-4-84) were drilled only into the shallow overburden, while the remaining three (TH-5-84 through TH-7-84) were drilled through the overburden and into the underlying bedrock. Soil and water samples were collected from all seven locations, and analyses revealed varying levels of VOCs. Two of the shallow test borings (TH-1-84 and TH-2-84) were completed as piezometers (designated P-1-84 through P-2-84, respectively), while the remaining two were plugged. All three of the open-hole bedrock test holes were completed with 6-inch casing to bedrock and were designated R-1 through R-3. Dedicated pumps were installed into each of these wells. Analysis of samples obtained in 1984 detected VOCs, including TCE, dichloroethene (DCE), and vinyl chloride. An additional bedrock well (R-4) was installed in July, 1985, along the eastern property boundary.

Table 1

Previous Environmental Investigation Activities

Date / Event	
1984	Discovery of 1,1,1-TCA and TCE in the groundwater beneath the EKCO facility. Sampling done by Wadsworth Testing Laboratories, Inc.
Fall 1984	Seven test holes were drilled, four in the overburden and three in the bedrock. Two of the overburden holes were completed as 1 ¼ inch (i.d.) piezometers and the three bedrock holes were completed as 6 inch (i.d.) casing bedrock wells (R-1 through R-3).
July 1985	An additional bedrock well (R-4) was installed along the eastern boundary. No VOCs were found.
February 1986	W-10 was converted into a recovery well for a pump and treat system. An air stripper was installed on-site. The discharge of the stripper was directed to Newman Creek.

Date / Event	
June 1986	Floyd Brown and Associates, Inc. (FBA) developed a preliminary closure plan for the lagoon. Phase I of the plan called for 12 soil borings. No VOCs were detected in any of the borings.
January/February 1987	A more intensive soil boring (Phase II) was conducted by FBA. The program consisted of 25 soil borings. Four of the borings were completed as 1 ½ inch PVC wells to monitor the lagoon.
July 1987	Weston was contracted to develop a final closure program for the lagoon and to develop a groundwater quality assessment program.
September 1987	Weston conducted a baseline assessment of the EKCO facility, which included sampling of all on-site wells including Ohio Water Service (OWS) Well 4, collecting data, OVA readings, construction and water level measurements, surveying on-site wells, groundwater utilization survey, and reviewing of plant records.
February 1988	Weston began monthly sampling of OWS Wells 1, 2, 3, and 5. These wells were sampled until March 1990.
June/July 1988	Installation of 13 monitoring wells, eight of which were installed to characterize the stratigraphy of water bearing zones, to determine the depth of bedrock and to assess the hydraulic interconnection between the unconsolidated sand, gravel, and clay aquifer and the Pottsville sandstone. The other five wells were installed in accordance with RCRA Part 265, Subpart F for surface impoundment closure.
December 1988	Weston performed a soil gas survey to identify potentially contaminated areas. In these areas, Weston took soil borings to determine the vertical extent of any contamination. Weston also sampled all on-site wells including the on-site production wells.
May 1989	Weston initiated the quarterly sampling of the five lagoon wells (L-1 through L-5).
April 1991	Weston conducted packer tests to evaluate the extent of interconnection between overburden and bedrock wells.
June/August 1991	Weston installed 13 monitoring wells to evaluate off-site groundwater conditions.
September 1991	Weston sampled all monitoring wells including W-1 and W-10.
March 1992	Weston sampled monitoring wells.

Date / Event	
May 1992	EKCO removed soil contaminated from the 330-gallon 1,1,1-TCA spill north of the plant.

Because the then out-of-service production well (W-10) was centrally located on the EKCO property, it was decided that a pump and treat program using this well would be initiated at the facility to control migration of VOCs and to remediate the VOCs detected in groundwater. An air stripper was installed in February of 1985 to treat the groundwater recovered by the pumping of well W-10.

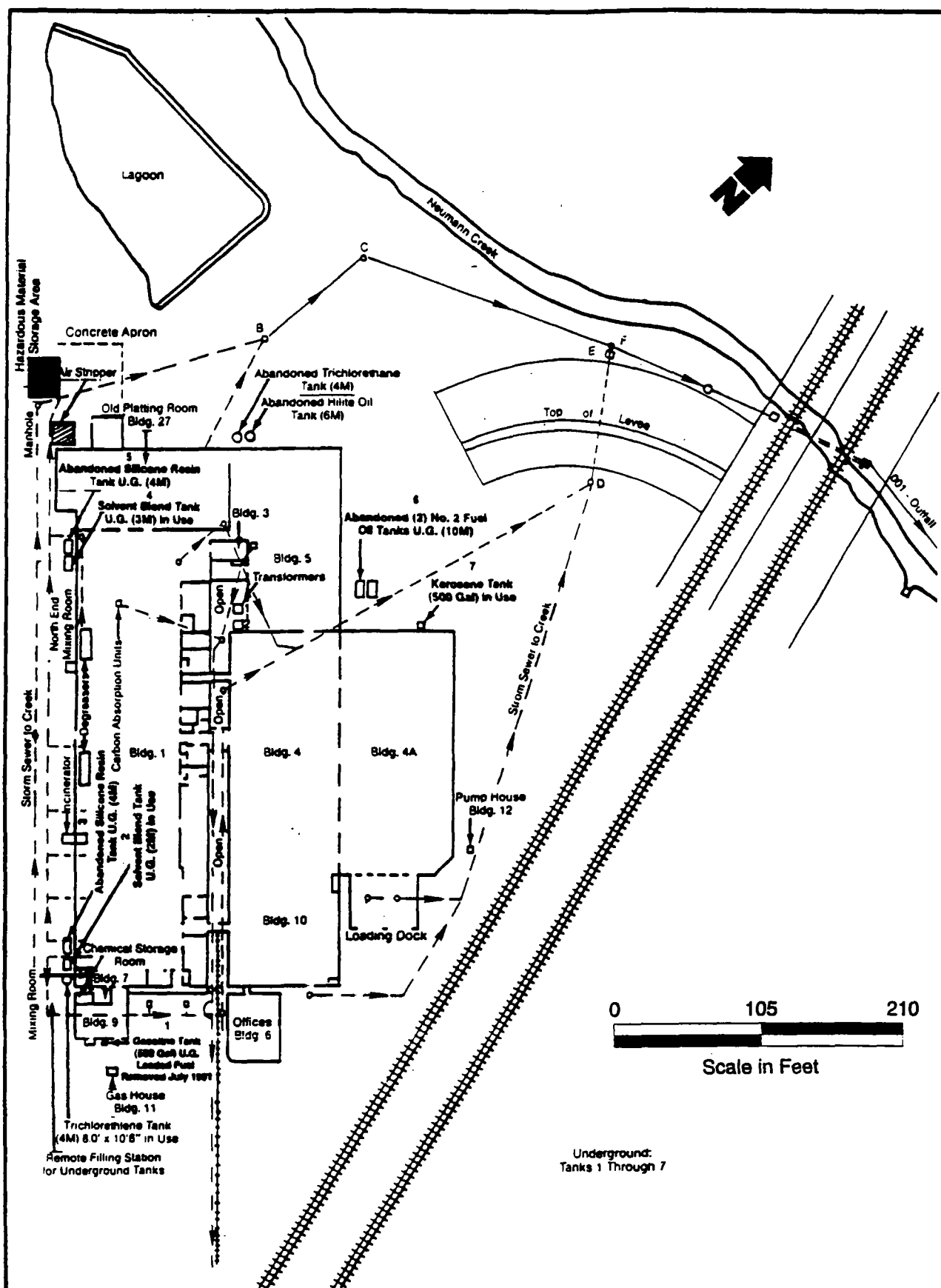
In June 1986, EKCO began development of a preliminary closure plan for the lagoon. The closure plan led to a Phase I screening investigation of the lagoon, which involved this drilling and composite sampling of 12 soil borings. Laboratory analyses of soil samples from this program indicated elevated levels of cadmium, chromium, and lead in soil samples collected within the lagoon and in locations between the lagoon and Newman Creek. (See the Groundwater Quality Assessment Plan for EKCO Housewares - March, 1988, for more information results and locations).

Phase I led to a more intensive Phase II soil investigation in January and February 1987. This involved installation of 25 additional soil borings. Phase II results again indicated elevated concentrations of cadmium, chromium, and lead in soils to the maximum depth of the borings.

In September 1987, a groundwater quality assessment for the facility was conducted to collect baseline information and to determine the need for interim measures at the facility. This included the following activities:

- sample all on-site wells and the contaminated municipal well (OWS-4) to establish baseline data and collect well data.
- survey all on-site wells.
- conduct a groundwater utilization survey, which included identifying and locating various wells near the facility.
- review of plant records and other available documents.

VOCs (TCE, 1,1,1-TCA and their breakdown products) were detected in on-site shallow and bedrock groundwater monitoring wells. The results of the initial investigation are presented in Interim Measures Report dated February 1988. On-site pumpage was increased to enhance contaminant recovery and hydraulic control of groundwater.



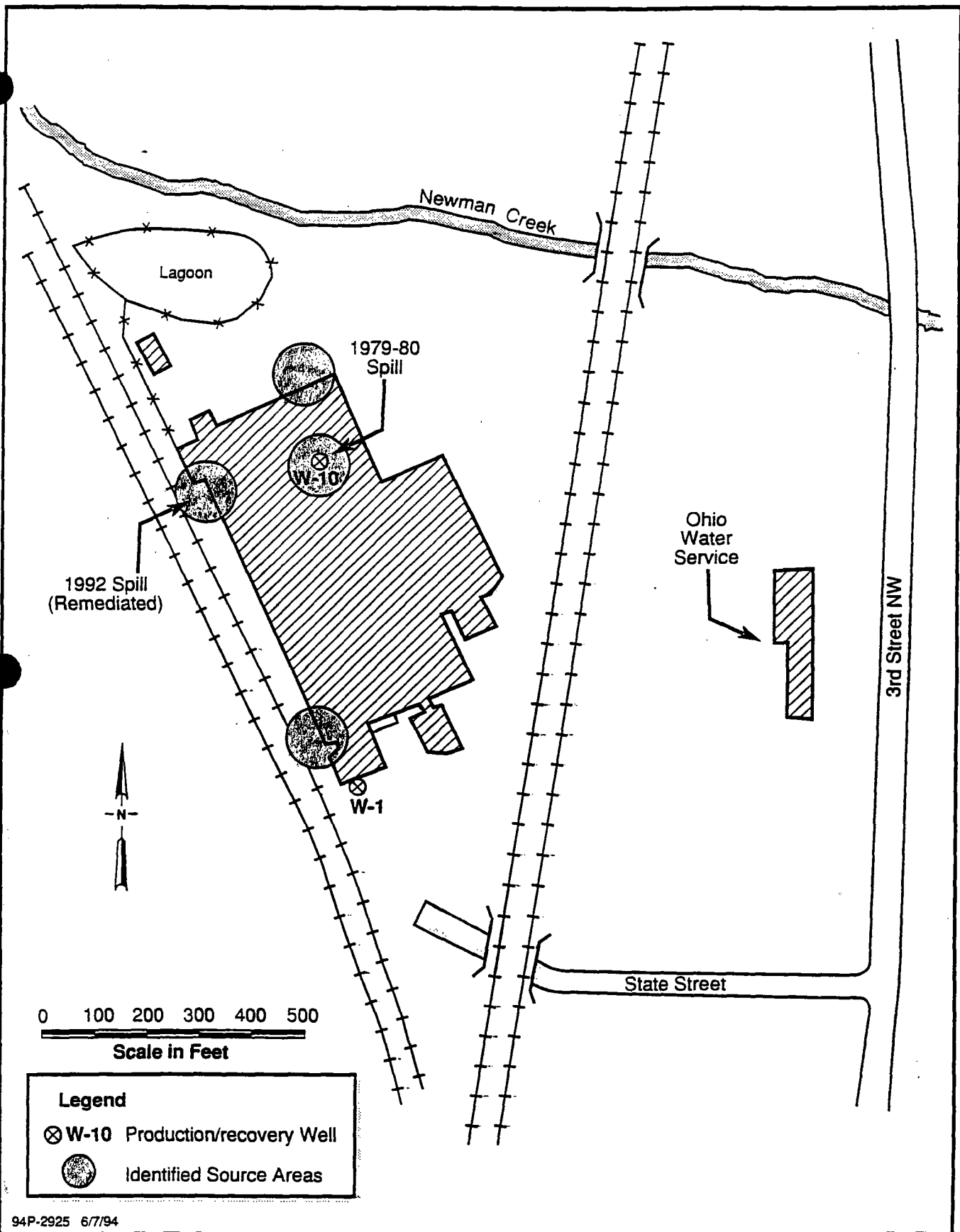


FIGURE 1-3 THE LOCATIONS OF DOCUMENTED SPILLS AND VOC SOURCE AREAS IDENTIFIED DURING THE RFI EKCO HOUSEWARES FACILITY – MASSILLON, OHIO

A groundwater quality assessment program was initiated in 1988. The general purpose of this effort was to address groundwater conditions at the facility and as part of the closure plan for the lagoon/surface impoundment. The results of this program are presented in the Groundwater Quality Assessment Report (1990). In 1989, U.S. EPA and EKCO signed a Consent Agreement (Administrative Order on Consent) under Section 3008(h) of the Resource Conservation and Recovery Act. Field activities for the RCRA facility investigation (RFI) were initiated at the facility in April 1991. The final report was approved in 1993. Conclusions of the RFI are presented in the conclusion section of the RFI Report, dated August 1993.

The surface impoundment was permanently closed in 1994 following remediation activities. The removal of all waste, system components and contaminated soils above the water table was conducted in addition to this proposed groundwater monitoring and remediation action. The lagoon/surface impoundment action consisted of requirements for clean closure. Those requirements for the removal of soils contaminated with metals and VOCs is as follows:

- Stabilization of materials within the lagoon through the addition of agents
- Excavate treated soils and dispose off-site as solid waste
- Grade, import clean backfill and vegetate lagoon area

In March 1994, the corrective measures study was approved. The contents of this document are summarized in this SB. In 1995, a baseline human health risk assessment for volatile organic chemicals in groundwater was completed for this facility. This risk assessment is also summarized in this SB.

ENVIRONMENTAL SETTING

GEOLOGY

The EKCO facility is situated on the western flank of a glacial valley that extends to the north and south and was carved from the Pennsylvanian age sedimentary rocks during the Pleistocene glaciation. Prior to the construction of the facility in 1945, a cover of fill material was used to level the natural glacially-formed topography at the building site. The glacially deposited sediments form a thin veneer less than 20 feet thick in the western portion of the site where bedrock is shallow. In the eastern portion of the site, the sediments fill the glacial valley, reaching a maximum thickness of greater than 250 feet. Figures 1-4 and 1-5 show geologic cross sections of the stratigraphic units beneath the site.

Based on the vertical distribution of the glacial sediments encountered during drilling, seven separate layers of unconsolidated material were identified and correlated between monitoring wells at the site. Three high permeability sand and gravel units were identified, separated by four low permeability silt and clay units. Underlying the glacial sediments, bedrock is encountered at its highest elevation in the northwestern portion of the facility and slopes to the east at an angle of approximately 17°. Bedrock consists of four interbedded layers. The shallowest bedrock unit

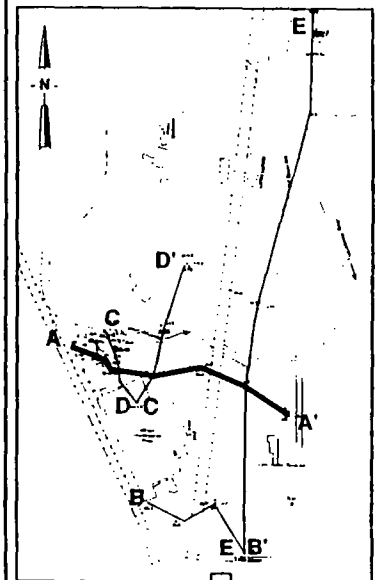
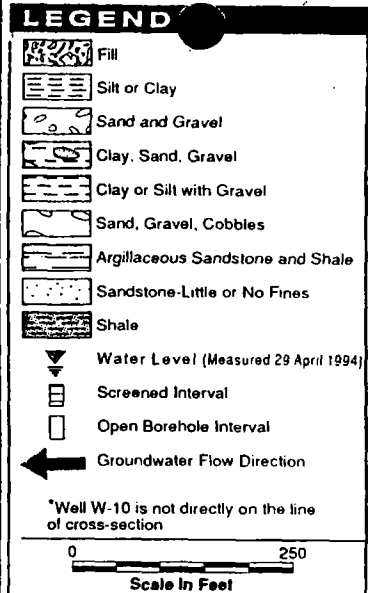
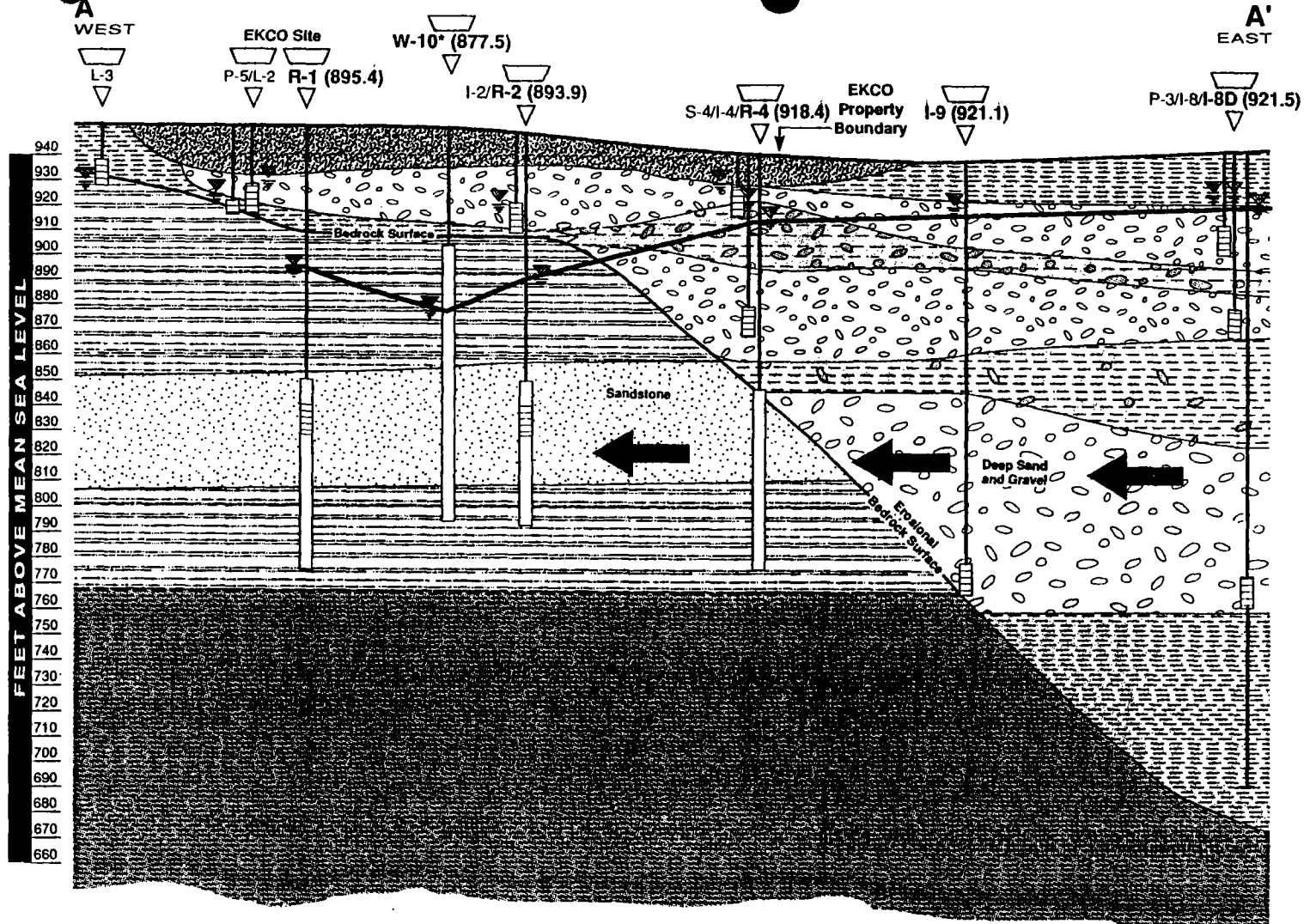


FIGURE 1-4
ANNOTATED GEOLOGIC
CROSS SECTION A-A'
AT THE EKCO HOUSEWARES PLANT,
MASSILLON, OHIO

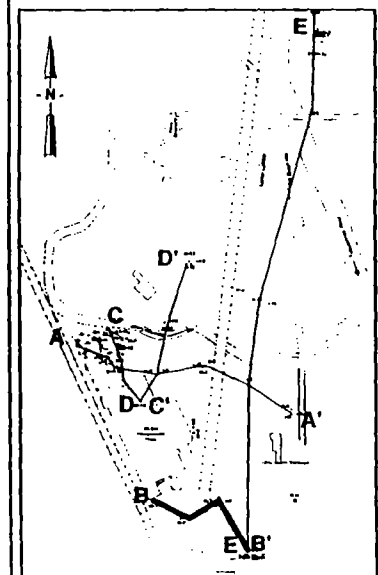
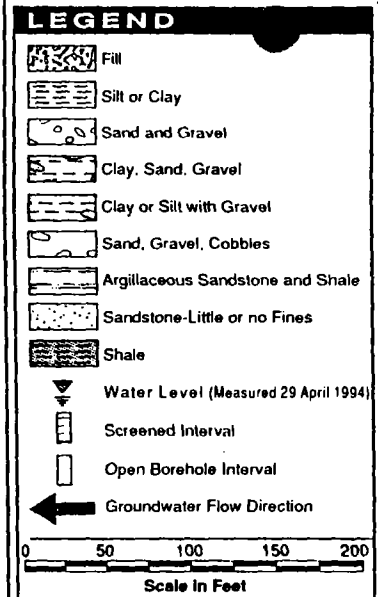
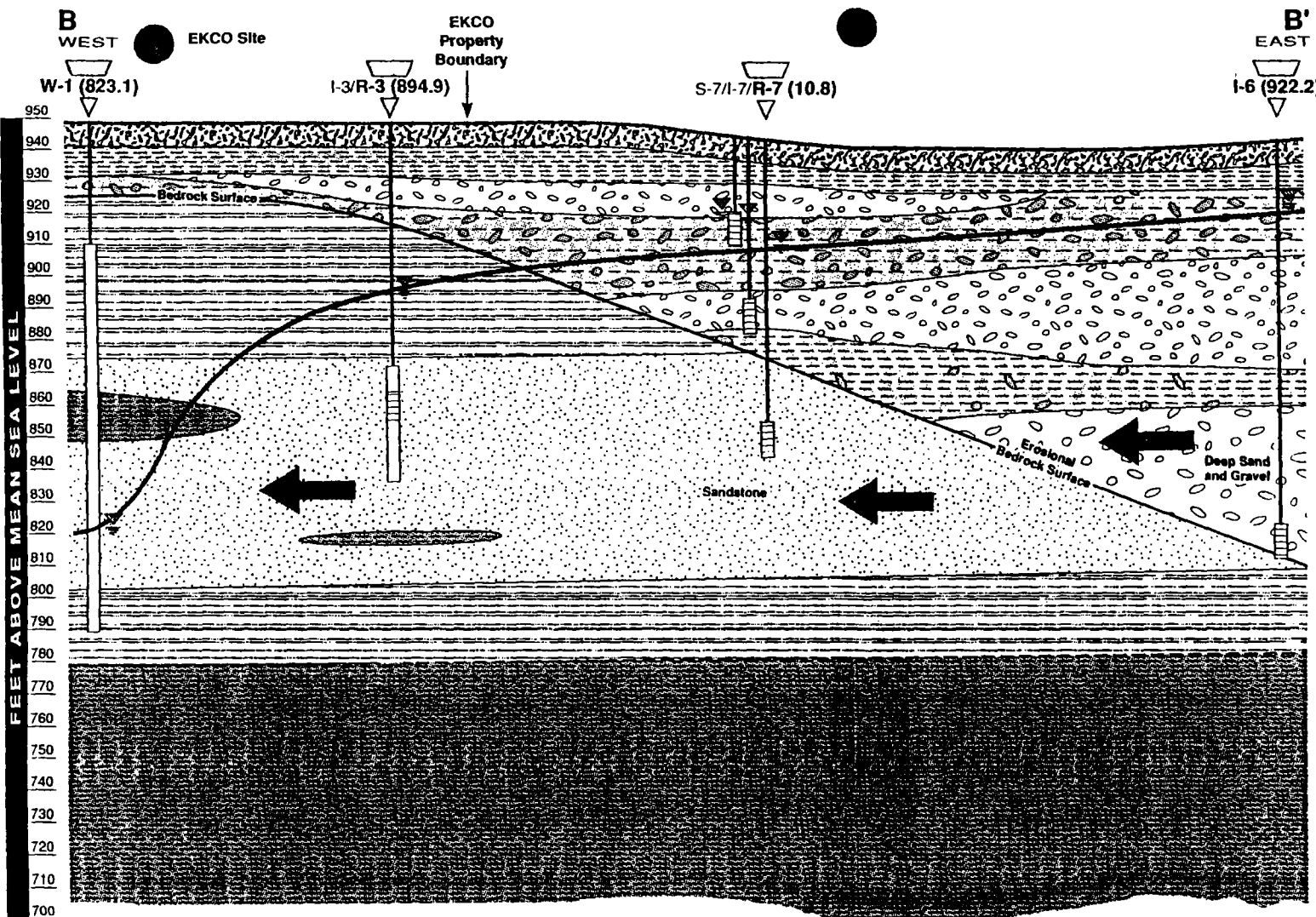


FIGURE 1-5
ANNOTATED GEOLOGIC
CROSS SECTION B-B'
AT THE EKCO HOUSEWARES PLANT,
MASSILLON, OHIO

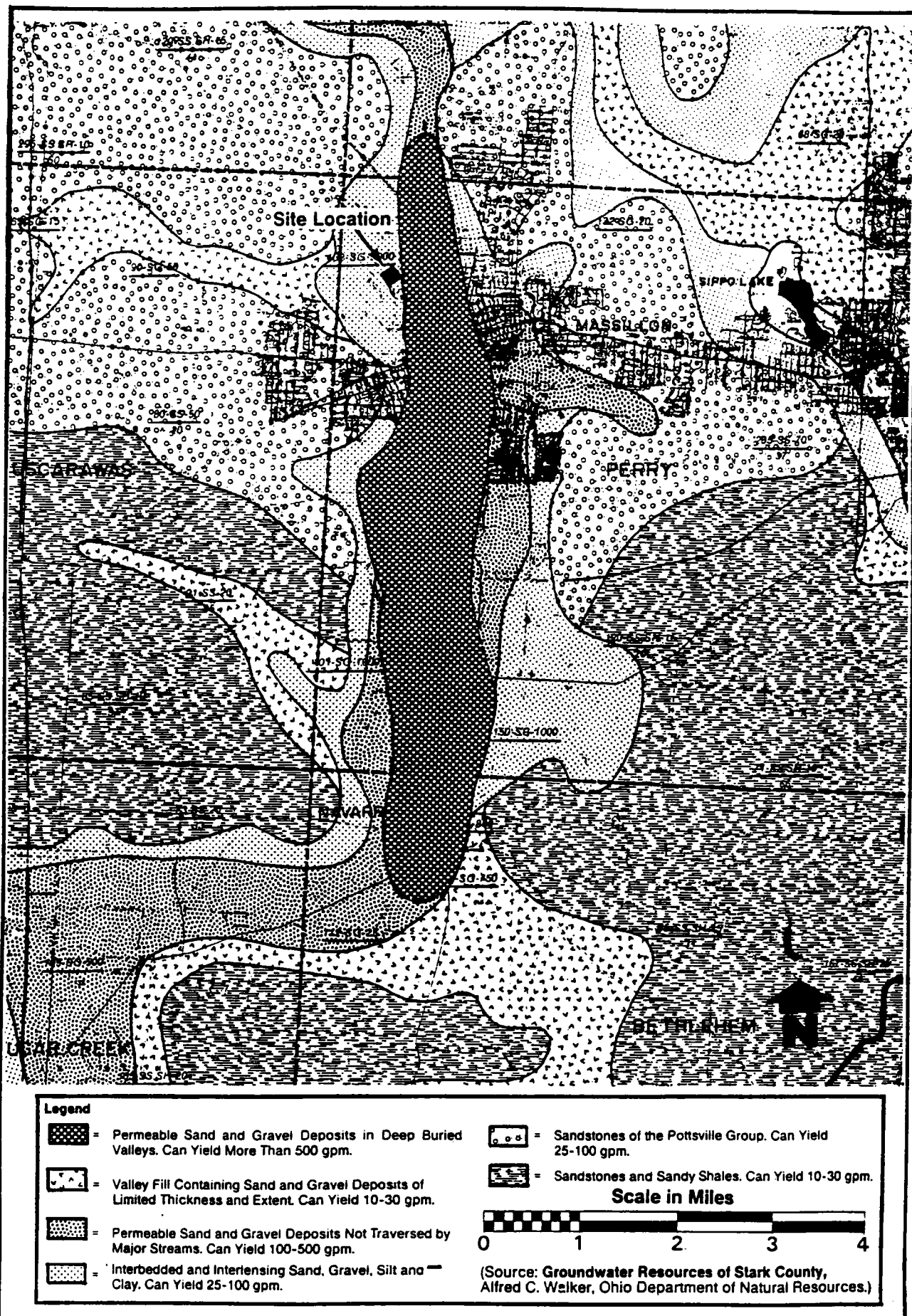


FIGURE 1-6 GROUNDWATER RESOURCES OF MASSILLON, OHIO

encountered consists of an interbedded low permeable shale and argillaceous sandstone, which is underlain by a highly permeable, well sorted sandstone. The sandstone unit is the primary bedrock water bearing unit. Below the sandstone is another low permeable interbedded shale and argillaceous sandstone unit, which is directly underlain by shale.

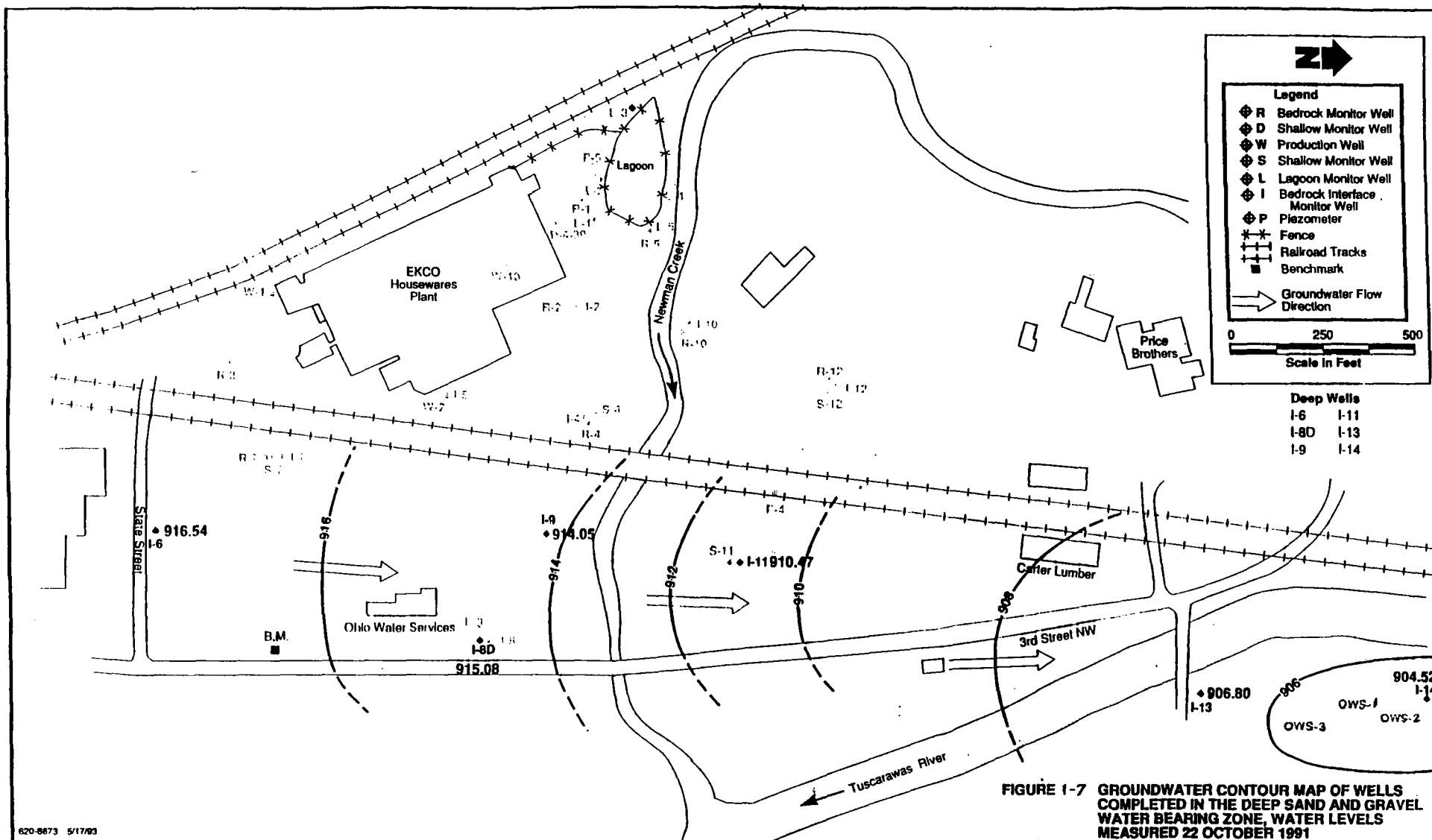
HYDRO GEOLOGY

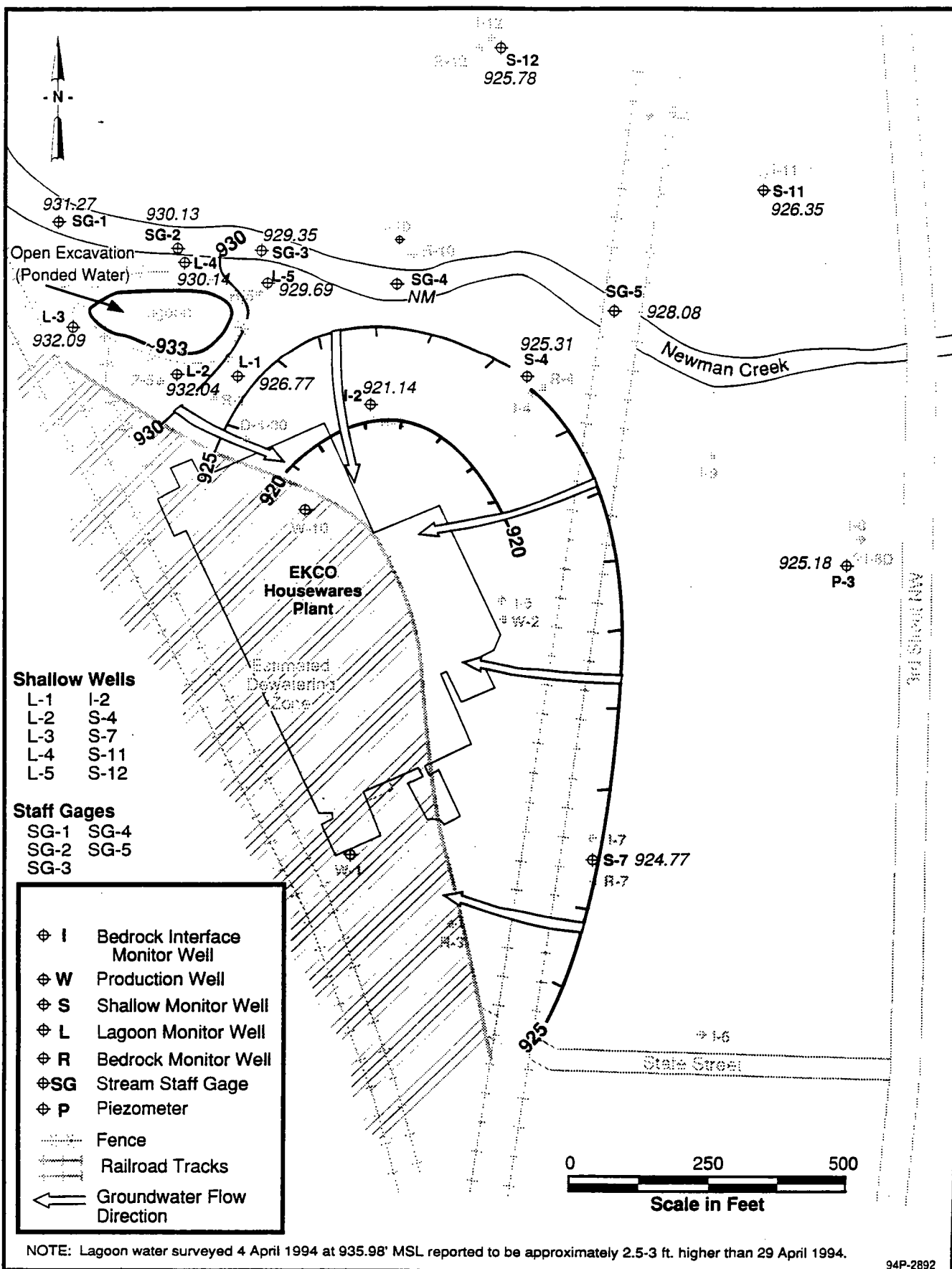
The vertical stratigraphy is divided into four distinct permeable hydrostratigraphic units, i.e., shallow sand and gravel, intermediate sand and gravel, deep sand and gravel, and sandstone bedrock. These highly permeable units are separated by low permeability clay and silt or shale and argillaceous sandstone (Figure 1-4, 1-5 and 1-6). In general, the sand and gravel and the sandstone units act as the primary medium for groundwater flow and the low permeable silt, clay, shale and argillaceous sandstone act as barriers to groundwater flow; however, variations in permeability occur locally, and they are not laterally continuous across the site. There are five groundwater production wells in the area of the site, all of which have an effect on the groundwater flow system. EKCO uses the two sandstone bedrock production wells, W-1 and W-10, pumping at a total of approximately 600 gallons per minute (g.p.m.) to provide water for the manufacturing facility. OWS pumps the three production wells (OWS 1, 2, and 3) intermittently from the deep sand and gravel up to 2,800 g.p.m. to provide water for the City of Massillon.

Groundwater contour maps for the site indicate that the pumping of the EKCO production wells W-1 and W-10 appreciably affects the groundwater flow in the shallow, intermediate, and the bedrock water-bearing zones. On-site recovery wells do not have any effect on the deep sand and gravel layer that overlies the bedrock. The flow system in this interval is governed by the OWS wells, which pull the groundwater to the north. A draw down cone exists in these three units around wells W-1 and W-10. As a result of the pumping, the groundwater in the shallow (Figure 1-8), intermediate (Figure 1-9), and bedrock (Figure 1-10) water-bearing zones under the entire site is flowing directly toward production wells W-1 and W-10, and does not appear to flow off-site. Groundwater in the deep sand and gravel water bearing unit flows directly north toward the pumping OWS production wells OWS 1, 2, and 3 (Figure 1-7).

SUMMARY OF RCRA FACILITY INVESTIGATION (RFI)

EKCO has performed several investigations and interim measures since the discovery of the groundwater contamination in 1986. These activities have included sampling of groundwater, surface water, soil and soil gas, and the completion of 25 soil borings and the installation of 29 groundwater monitoring wells. The results of these activities have led to the following conclusions. The main sources of VOC contamination are located at recovery well W-10 and the tank area north of the building. The groundwater on-site is contaminated and groundwater contamination has migrated off-site. It is estimated that 3,500 cubic yards of soil contamination exists under the building and 4,900 cubic yards of soil contamination exists outside the building on the facility property.





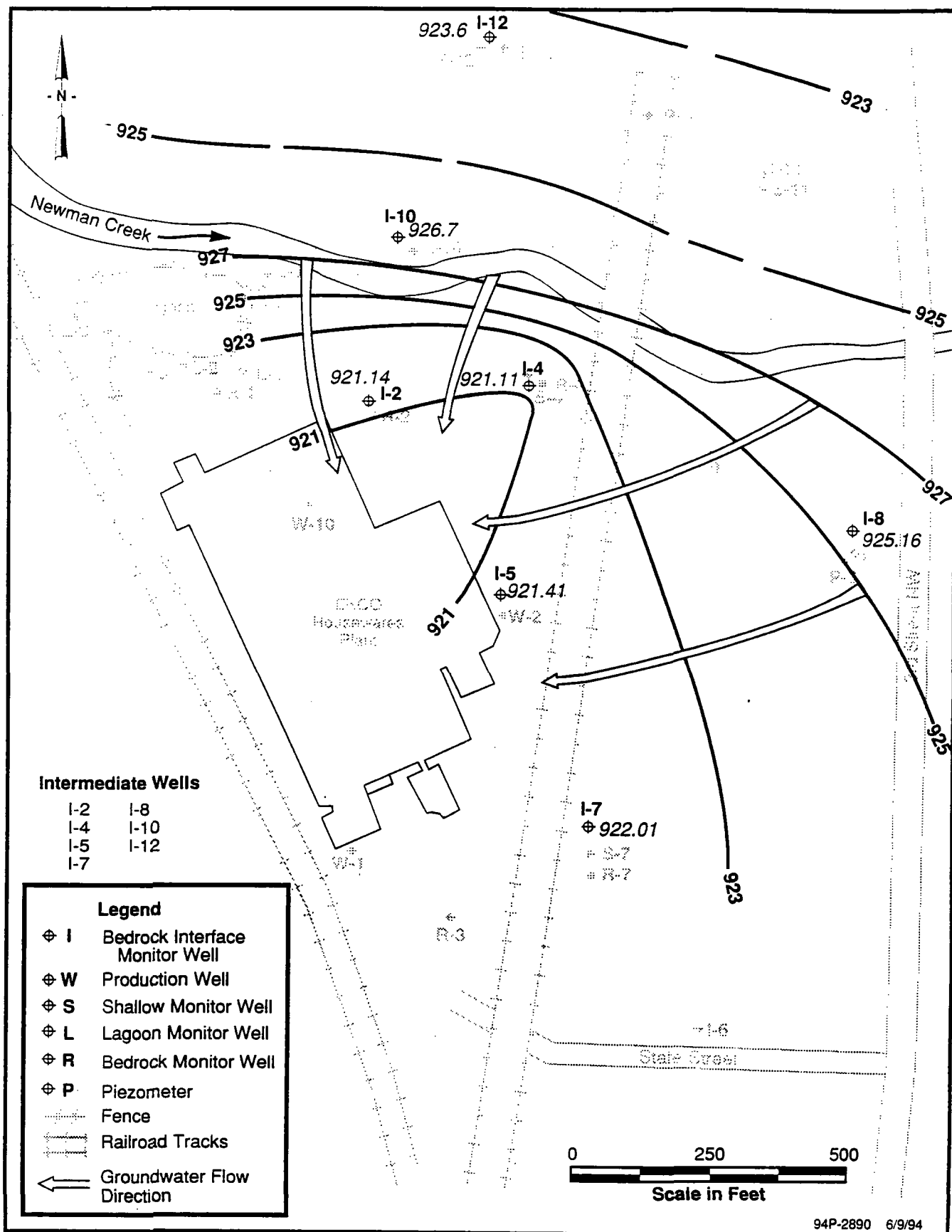
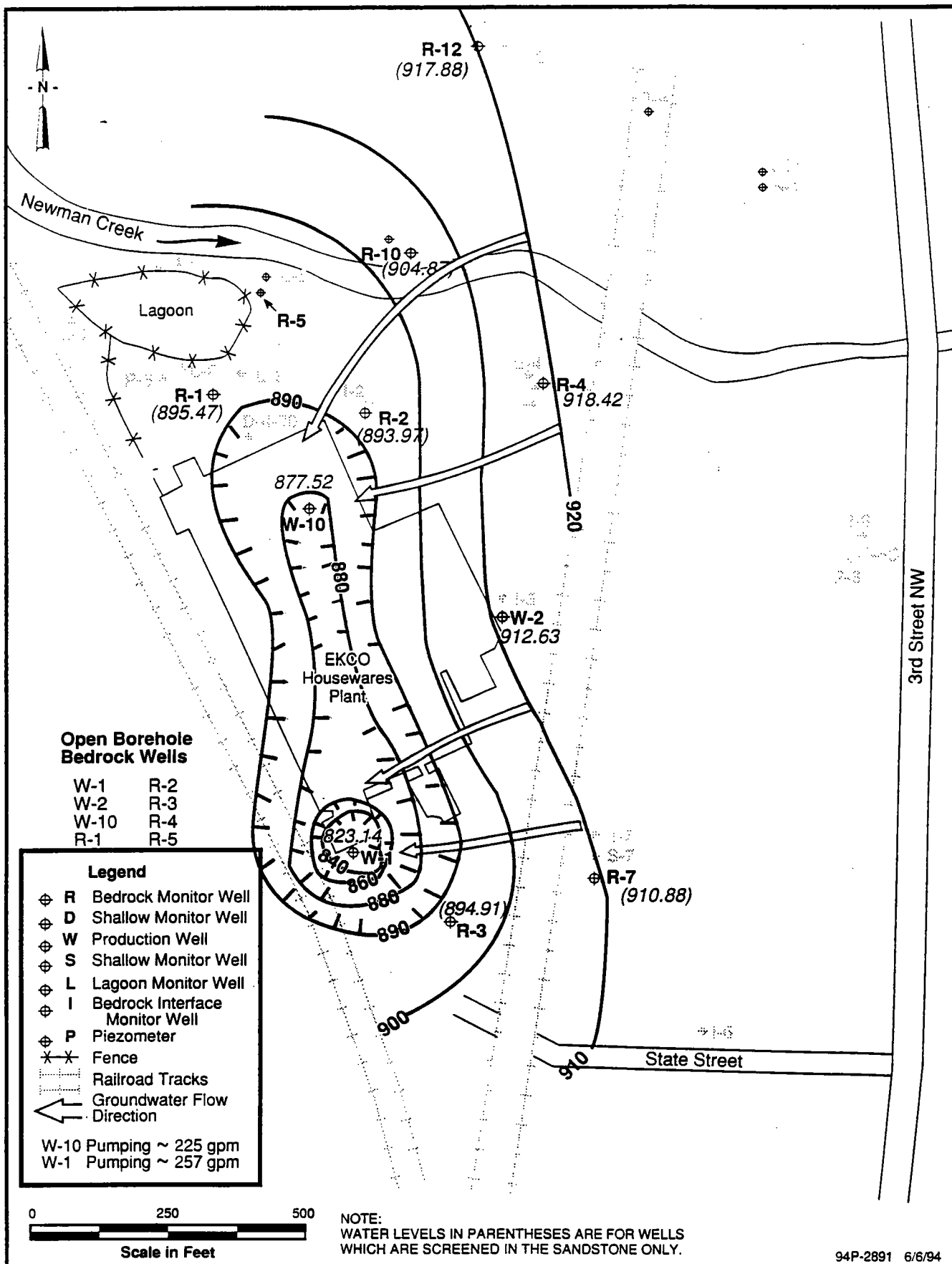
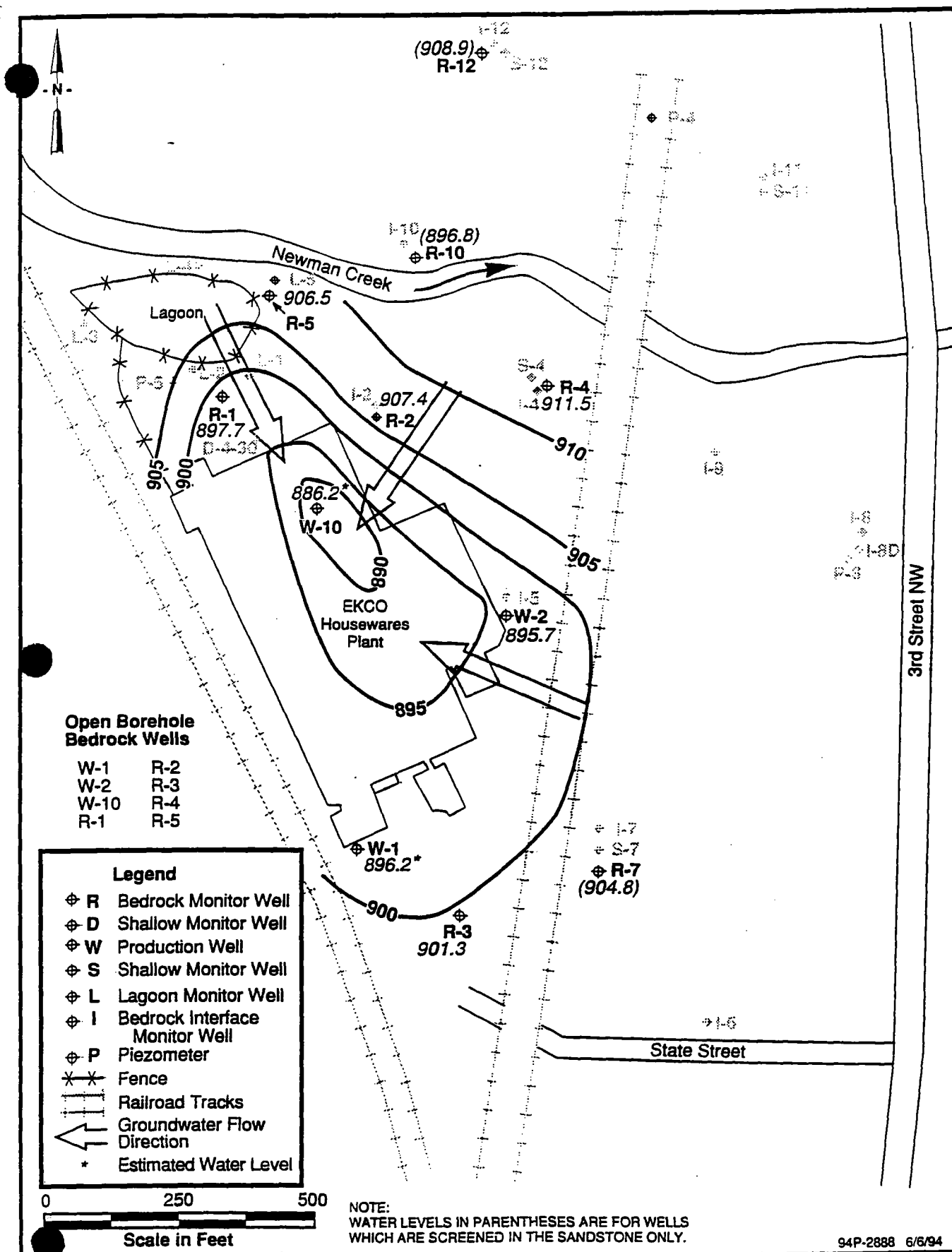


FIGURE 1-9 GROUNDWATER CONTOUR MAP OF WELLS COMPLETED IN THE INTERMEDIATE SAND AND GRAVEL WATER BEARING ZONE, WATER LEVELS MEASURED 29 APRIL 1994 EKCO FACILITY – MASSILLON, OHIO



**FIGURE 1-10 GROUNDWATER CONTOUR MAP OF WELLS COMPLETED IN THE BEDROCK, 29 APRIL 1994
EKCO HOUSEWARES FACILITY – MASILLON, OHIO**



**FIGURE 1-10 GROUNDWATER CONTOUR MAP OF WELLS COMPLETED IN THE BEDROCK, WATER LEVELS MEASURED 22 OCTOBER 1991
EKCO HOUSEWARES FACILITY – MASSILLON, OHIO**

GROUNDWATER IMPACTS

On going groundwater monitoring has demonstrated that the groundwater beneath and adjacent to the facility has been contaminated with volatile organic compounds from the chlorinated ethene family or the chlorinated ethane family. Members of both of these groups breakdown in the environment, through inorganic dechlorination and other mechanisms to create successively lighter daughter compounds. Groundwater contamination is found in the shallow, intermediate and bedrock water bearing zones. Figures 1-11 thru 1-13 indicate the concentration of trichloroethane (TCE) in groundwater in the various water bearing zones at the EKCO facility. Metals found in the soils in and around the lagoon/surface impoundment have not migrated into the groundwater.

SUMMARY OF FACILITY RISKS (GROUNDWATER)

A baseline risk assessment was prepared for the facility as part of the Corrective Measures Study (CMS). The purpose of the risk assessment was to determine the present and future potential risks to public health and the environment posed by this facility, based on existing conditions. Specifically, the objective was to assess health risks to a hypothetical future on-site resident from exposure to volatile organic compounds (VOCs) in the upper (shallow, intermediate) and lower (bedrock) units.

This baseline risk assessment evaluated potential risks to human health given no action in remediating groundwater or soil at the facility, i.e., cessation of the existing groundwater pump and treat program. This assessment is based on a worst-case scenario of future residential use of the aquifer.

The chemical constituents of concern at this facility consist of carcinogenic and noncarcinogenic compounds found in groundwater at significant levels. (See Figures 1-2 and 1-3). For carcinogens, the lifetime cancer risk is calculated for each constituent, as well as summed for all carcinogens to give a total cancer risk.

The sum of the potential risk from each carcinogen indicated the following cumulative risk for exposure to carcinogens and noncarcinogens under worst-case residential exposure scenarios:

Exposure to Carcinogens Lifetime Cancer Risk

Worst Case

1.00 X 10⁻² - shallow and intermediate bedrock unit
1.00 X 10⁻³ - lower bedrock unit

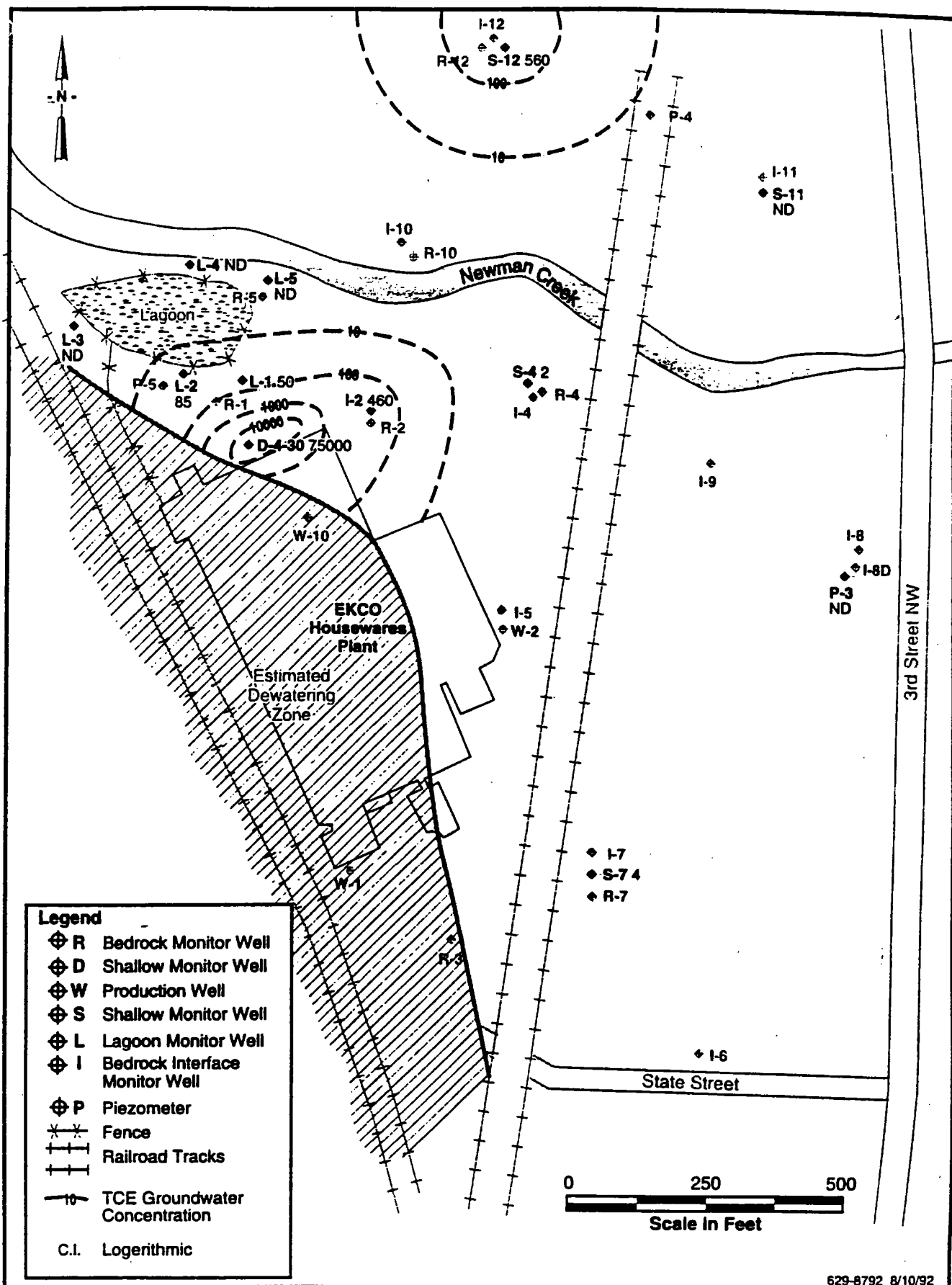
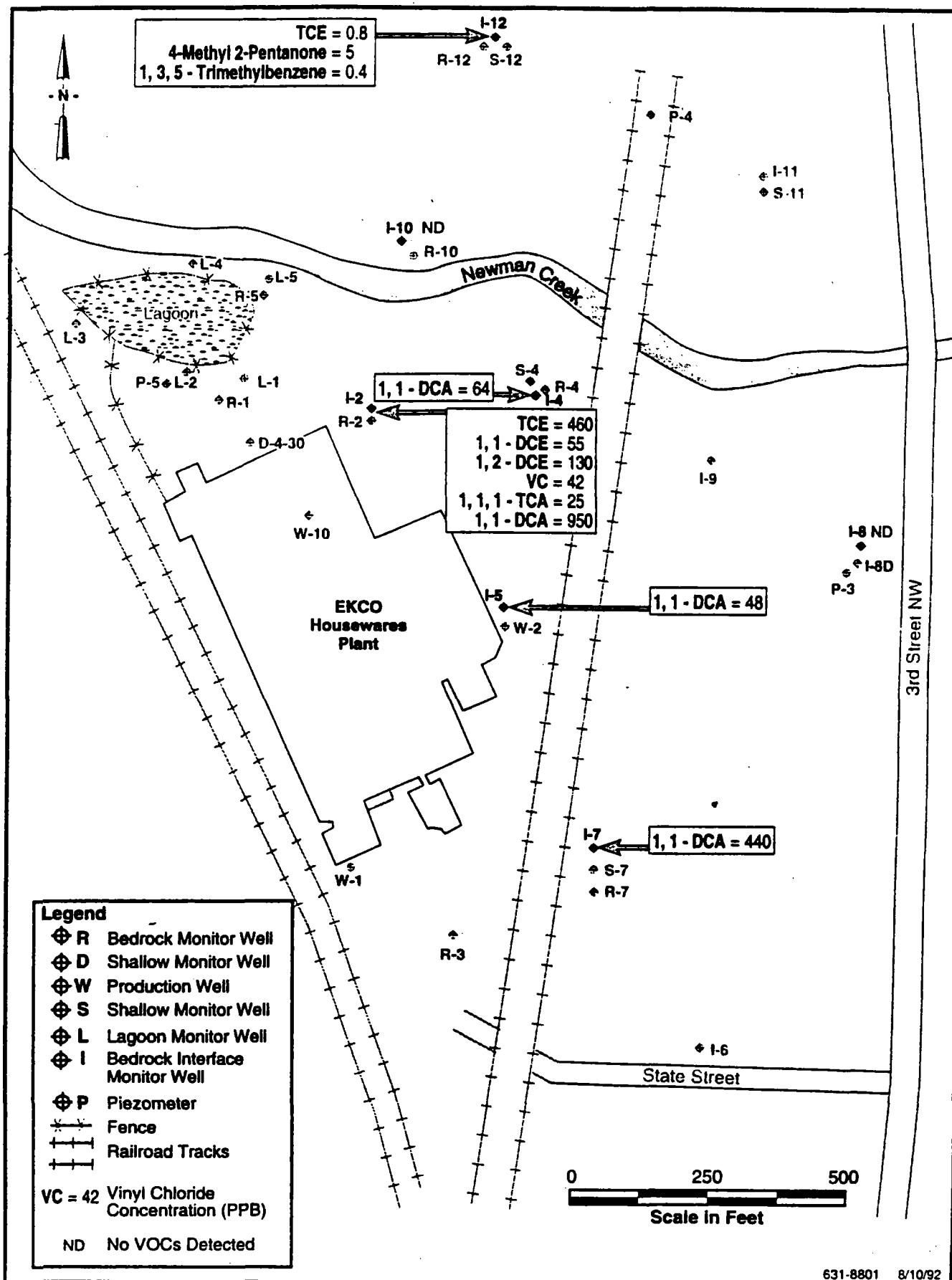
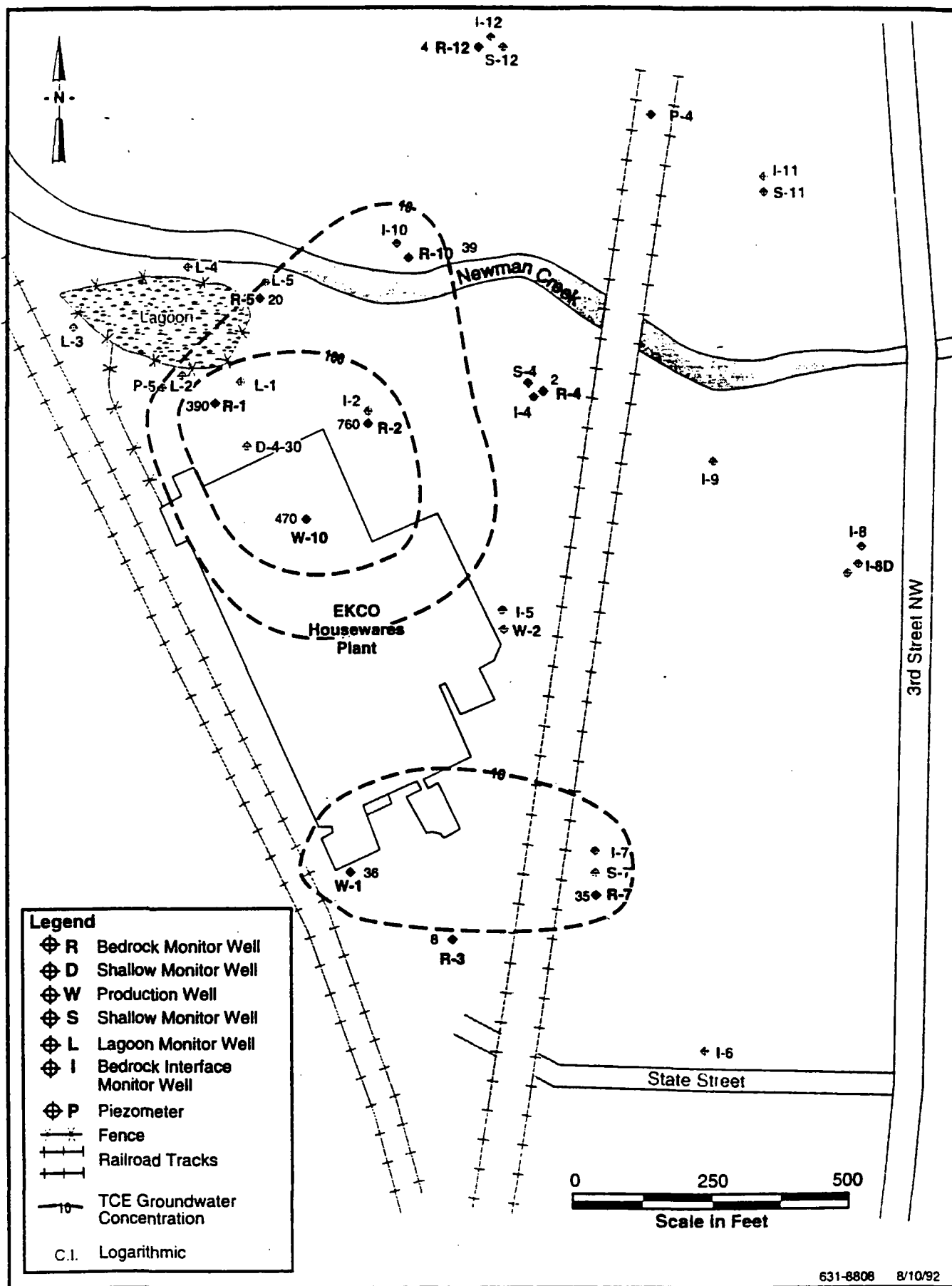


FIGURE 1-11 CONCENTRATION OF TRICHLOROETHENE (TCE) IN GROUNDWATER (PPB) FOR WELLS SCREENED IN THE SHALLOW WATER BEARING UNIT. WELLS WERE SAMPLED SEPTEMBER 1991





631-8808 8/10/92

FIGURE 1-13 CONCENTRATION OF TRICHLOROETHENE (TCE) IN GROUNDWATER (PPB) FOR WELLS SCREENED IN BEDROCK WATER BEARING UNIT. WELLS WERE SAMPLED SEPTEMBER 1991

The actual risk for the upper unit is $1\text{E}-02$ being about one order of magnitude higher than the lower unit ($1\text{E}-03$). The same pattern was evident for noncancer risks. For both cancer and noncancer risks, the largest contributors by chemical were TCE, 1,1-DCE and vinyl chloride, with groundwater ingestion and inhalation while showering posing the greatest risks. The carcinogens pose a greater risk than one in one million (1×10^{-6}) under this worst case scenario. The baseline risk assessment can be found in the Administrative Record document #EHI-166.

Based upon the results of the RFI, it was determined that contamination in two types of media at the facility posed concern: soils and groundwater contaminated with VOCs.

For the EKCO facility, media cleanup standards have been established which correspond to Maximum Contaminant Levels (MCLs). MCLs are federally enforceable drinking water standards developed under the Safe Drinking Water Act, 40 C.F.R. § 141, Subpart B. The cancer risk level represents the concentration of a carcinogen such that a person of average weight drinking 2 liters/day of water containing the contaminant would have no more than a 1 in 1 million chance (1×10^{-6}) of developing cancer from drinking the water during a 70 year lifespan. The contaminants found in groundwater above their respective MCLs were PCE, TCE, 1,1-DCE, 1,2-DCE, vinyl chloride, and 1,1,1-TCA.

The MCLs for the contaminants of concern are as follows (See Tables 2 & 3) :

- . PCE - .005 mg/L
- . TCE - .005 mg/L
- . 1,1-DCE - .007 mg/L
- . 1,2-DCE - .07 mg/L
- . Vinyl Chloride - .002 mg/L
- . 1,1,1,-TCE - .2 mg/L

The contaminated soils that need to be remediated fall into two categories: soils underneath the EKCO manufacturing building and soils outside of the building. The contaminants of concern for soils are TCE and 1,2-DCE. The estimated amount of soil to be remediated underneath the building is projected at 3,500 cubic yards of VOC contaminated soil. The soil outside of the building that needs to be remediated is projected at 4,900 cubic yards of VOC contaminated soil.

Partition modeling of contaminants found in soil borings was performed to calculate soil cleanup goals that would not cause groundwater to exceed MCLs under current pumping conditions. The calculated soil cleanup levels are:

- . TCE - 1.0 mg/kg
- . 1,2-DCE - 10 mg/kg

Based upon this assessment, actual or threatened releases of hazardous constituents from this facility, if not further addressed by the proposed remedy or one of the other remedies considered, may present a potential threat to human health and the environment.

Table 2

Data Summary for the Shallow Groundwater Unit
EKCO Housewares
Massillon, Ohio
(All Concentrations in $\mu\text{g/L}$)

Chemical	Frequency of Detection	Range of Detected Concentrations	Mean Concentration ^a	Upper 95 Percent Confidence Limit Concentration ^a	Exposure Point Concentration	Maximum Contaminant Level ^b
Acetone	3 / 32	4.4 - 17	3.27	4.25	4.25	NE
Benzene	2 / 32	0.15 - 4	1.1	1.45	1.45	5
2-Butanone	1 / 32	2.6	2.22	2.6	2.6	NE
Carbon disulfide	2 / 32	1 - 1.1	1.12	1.1	1.1	NE
Chloroethane	3 / 32	2 - 6.4	2.51	3.19	3.19	NE
Chloroform	3 / 32	1 - 10	1.4	1.99	1.99	100
1,1-Dichloroethane	27 / 32	1 - 2,200	279	451	451	NE
1,2-Dichloroethane	4 / 32	3.7 - 73	5	9.24	9.24	5
1,1-Dichloroethene	15 / 32	1.5 - 1,900	109	220	220	7
1,2-Dichloroethene (total)	18 / 32	1 - 480	61.4	93.7	93.7	70 ^c
Ethylbenzene	3 / 32	0.22 - 3	1.08	1.41	1.41	700
4-Methyl-2-pentanone	1 / 32	7	2.27	2.92	2.92	NE
Tetrachloroethene	4 / 32	0.86 - 55	4.29	7.71	7.71	5
Toluene	5 / 32	0.25 - 130	5.77	12.6	12.6	1,000
1,1,1-Trichloroethane	18 / 32	2.5 - 52,000	2,490	5,380	5,380	200
1,1,2-Trichloroethane	3 / 32	7.4 - 140	7.58	15.6	15.6	5
Trichloroethene	23 / 32	1 - 220,000	10,100	22,300	22,300	5
Vinyl chloride	12 / 32	4 - 150	18.2	28.4	28.4	2
Xylenes (total)	2 / 22	1.4 - 5	1.19	1.56	1.56	10,000

^a Calculated using "proxy" concentrations for nondetects equal to 1/2 of the sample reporting limit.

^b U.S. EPA Maximum Contaminant Level (MCL) (U.S. EPA, 1994b).

^c Value is for *cis* isomer. (MCL for *trans* isomer is 100 $\mu\text{g/L}$.)

NE - An MCL has not been established for this compound.

TABLE 3
DATA SUMMARY FOR THE BEDROCK GROUNDWATER UNIT
EKCO HOUSEWARES
MASSILLON, OHIO
(All Concentrations in $\mu\text{g/L}$)

Chemical	Frequency of Detection	Range of Detected Concentrations	Mean Concentration ^a	Upper 95% Confidence Limit Concentration ^a	Exposure Point Concentration	Maximum Contaminant Level ^b
1,1-Dichloroethane	5 / 6	2 - 150	52.4	102	102	NE
1,1-Dichloroethene	4 / 6	1 - 56	13.4	31.3	31.3	7
1,2-Dichloroethene (total)	5 / 6	4 - 260	59.0	142	142	70 ^c
1,1,1-Trichloroethane	4 / 6	5 - 1,200	216	613	613	200
Trichloroethene	6 / 6	5 - 430	98.7	234	234	5
Vinyl chloride	2 / 6	3.3 - 15	3.38	8.15	8.15	2

^a Calculated using "proxy" concentrations for nondetects equal to 1/2 of the sample reporting limit.

^b U.S. EPA Maximum Contaminant Level (MCL) (U.S. EPA, 1994b).

^c Value is for *cis* isomer. (MCL for *trans* isomer is 100 $\mu\text{g/L}$.)

NE - An MCL has not been established for this compound.

SUMMARY OF ALTERNATIVES

To address contamination at the EKCO Housewares facility, remedial action alternatives were evaluated for each area of concern. These remedial action alternatives are presented below. A more detailed description of the alternatives can be found in the CMS Report.

The following are offered and analyzed as remediation action alternatives for contaminated groundwater:

- Alternative GW - 1: No Action
- Alternative GW - 2: Groundwater Extraction, Air Stripping, Groundwater Monitoring and Well Permit Restrictions
- Alternative GW - 3: Pulse Pumping Groundwater Extraction, Air Stripping, Groundwater Monitoring and Well Permit Restriction
- Alternative GW - 4: Pulse Pumping and Continued Operation of the Existing Recovery System, Groundwater Monitoring and Well Permit Restriction
- Alternative GW - 5: Use of Overburden Recovery Wells and Pulse Pumping Groundwater Extraction of W-1 and W-10, Air Stripping, Groundwater Monitoring and Well Permit Restrictions
- Alternative GW - 6: Air Sparging of Shallow Zone and Pulse Pumping Groundwater Extraction of W-1 and W-10, Air Stripping, Groundwater Monitoring and Well Permit Restrictions

The following are offered and analyzed as remedial action alternatives for contaminated soils underneath the building:

- Alternative IS - 1: No Action
- Alternative IS - 2: Soil Vapor Extraction (SVE) Treatment
- Alternative IS - 3: Horizontal Soil Vapor Extraction

The following are offered and analyzed as remedial action alternatives for contaminated soils outside the building:

- Alternative OS - 1: No Action
- Alternative OS - 2: Fence and Post Warning Signs

2 Alternative OS - 3: Soil Vapor Extraction Treatment

Alternative OS - 4: Ex-Situ Volatilization

Alternative OS - 5: Low Temperature Thermal Treatment

Alternative OS - 6: Excavation and Off-Site Disposal/Incineration

ALTERNATIVES FOR CONTAMINATED GROUNDWATER

Alternative GW - 1: NO ACTION

The no action alternative provides a baseline for comparison with other remedial alternatives. No corrective measures would be implemented for this alternative. There would be no reduction in the risks currently posed by the contaminated groundwater with this no action alternative. There are no costs associated with this no action alternative.

Alternative GW - 2: GROUNDWATER EXTRACTION, AIR STRIPPING, GROUNDWATER MONITORING AND WELL PERMIT RESTRICTIONS

The groundwater extraction, air stripping, groundwater monitoring and well permit restrictions alternative consists of installing additional recovery wells with continued operation of monitoring wells W-1 and W-10. Two additional wells would be installed and used to control groundwater in the shallow and intermediate water-bearing zones. The groundwater that is recovered would be treated using the existing air stripper. Current groundwater monitoring would continue on a semi-annual basis. Wells which may not be required for monitoring would be grouted and sealed. Groundwater well permits and usage would be restricted for use in this area.

Duration: 30+ years

Capital Costs: \$99,000

Annual O&M: \$147,000

Total Costs: \$4,509,000

Alternative GW - 3: PULSE PUMPING GROUNDWATER EXTRACTION, AIR STRIPPING, AND GROUNDWATER MONITORING

The pulse pumping groundwater extraction, air stripping, and groundwater monitoring alternative would include installation of additional recovery wells and pulse pumping of existing bedrock wells. Three additional recovery wells would be installed and used to control groundwater contamination and flow in the shallow and intermediate water-bearing zones. Operation of the existing well recovery system would be modified, so that recovery wells W-1 and W-10 would be

operating on an alternating (pulsed) basis. The average flow rate of the system would be reduced and higher VOC removal rates are predicted. The objective of this alternative would be to increase the overall mass flow rate (i.e., pounds per year) of VOCs removed. The existing air stripper will be used to treat the recovered contaminated groundwater. Groundwater monitoring would continue to be performed on a semi-annual basis. Wells which are not required for groundwater monitoring would be grouted and sealed.

Duration: 30+ years

Capital Costs: \$173,000

Annual O&M: \$154,000

Total Costs: \$4,793,000

Alternative GW - 4: PULSE PUMPING, CONTINUED OPERATION OF THE EXISTING RECOVERY SYSTEM AND GROUNDWATER MONITORING

The pulse pumping, continued operation of the recovery system and groundwater monitoring alternative would modify operation of the existing recovery system, so recovery wells W-1 and W-10 would be operating on an alternating (pulse) basis. The average flow rate of the system would be reduced and higher VOC removal rates are predicted. The objective of this alternative would be to increase the overall mass flow rate (i.e., pounds per year) of VOCs removed. The existing air stripper will be used to treat the recovered contaminated groundwater. Groundwater monitoring would continue to be performed on a semi-annual basis. Wells which are not required for groundwater monitoring would be grouted and sealed.

Duration: 30 + years

Capital Costs: \$86,800

Annual O&M: \$98,300

Total Costs: \$2,702,300

Alternative GW - 5: USE OF OVERBURDEN RECOVERY WELLS AND PULSE PUMPING GROUNDWATER EXTRACTION OF W-1 AND W-10, AIR STRIPPING, AND GROUNDWATER MONITORING

The use of overburden recovery wells and pulse pumping groundwater extraction of W-1 and W-10, air stripping, and groundwater monitoring alternative would include installation of additional recovery wells and pulse pumping of existing bedrock wells. Contaminated bedrock groundwater will be recovered using wells W-1 and W-10, as described in Alternative GW - 3. For this alternative, groundwater will also be recovered from the overlying aquifers. Four new overburden recovery wells will be installed (or existing monitor wells will be converted to recovery wells) for enhanced recovery of the shallow and intermediate water-bearing zones. Location of these recovery wells would be determined using a groundwater flow model. Based on the results of this flow model, the location and pumping rate of recovery wells for the shallow and intermediate water-bearing zones will be finalized. The existing air stripper will be used to

treat the recovered contaminated groundwater. Groundwater well permits and usage would be restricted for use in this area.

Duration: 30 + years

Capital Costs: \$183,800

Annual O&M: \$129,200

Total Costs: \$5,643,200

Alternative GW - 6: AIR SPARGING OF SHALLOW ZONE AND PULSE PUMPING OF W-1 AND W-10 GROUNDWATER RECOVERY, AIR STRIPPING, AND GROUNDWATER MONITORING

The air sparging of shallow zone and pulse pumping of W - 1 and W - 10 groundwater recovery, air stripping, and groundwater monitoring alternative would include installation of additional recovery wells and pulse pumping of existing bedrock wells. Contaminated bedrock groundwater will be recovered using wells W-1 and W-10 as discussed in Alternative GW - 3. For this alternative, air sparging will be implemented in conjunction with soil the remediation action described in Alternative OS - 3, SVE.

Air sparging is a technology that mechanically introduces air below the water table, using an air compressor to feed a series of injection wells. VOCs that are dissolved in the groundwater volatilize into the air as the air bubbles move through the groundwater. The VOC-laden air stream is then collected from the vadose zone using a SVE system. The dimensions of the area to be treated using air sparging are dependent on the final extent of the proposed SVE for the area. This alternative proposes the operation of the air stripper would continue without modification. Air sparging is estimated to be performed for 2 years. Groundwater well permits and usage would be restricted in this area.

Duration: 30 + years for everything except the air sparging that is expected to be completed in 2 years.

Capital Costs: \$235,200

Annual O&M: \$185,200 for years 1 and 2. Years 3 - 30, annual O&M is estimated at \$98,300.

Total Costs: \$3,259,700

ALTERNATIVES FOR CONTAMINATED SOILS UNDERNEATH THE BUILDING

Alternative IS - 1: NO ACTION

The no action alternative provides a baseline for comparison with other remedial alternatives. No corrective measures would be implemented for this alternative. There would be no reduction in the risks currently posed by the contaminated soils with this no action alternative. There are no costs associated with this no action alternative.

Alternative IS - 2: SOIL VAPOR EXTRACTION (SVE) TREATMENT

This alternative would consist of the installation of a soil vapor extraction system (SVE) that would remove VOCs from the soils underneath the northeastern corner of the building. SVE removes VOCs from the soil by mechanically drawing air through soil pore spaces. Air injection vents and vertical or horizontal recovery vents would be installed into the soil through the floor of the building. The volatilized VOCs would be removed and treated using granular activated carbon (GAC), if necessary. A pilot system would be installed and additional soil borings would be completed to determine the scale of the system in the area underneath the northeastern corner of the plant and define the placement of vents for a full-scale system.

Duration: 1 year

Capital Costs: \$524,000

Annual O&M: \$228,000 + one time charge of \$19,000 for confirmatory sampling.

Total Costs: \$771,000

Alternative IS - 3: HORIZONTAL SOIL VAPOR EXTRACTION TREATMENT

This alternative would consist of the installation a SVE system that would remove VOCs from the soil underneath the northeastern corner of the building. Air injection vents and recovery vents would be installed from outside the building and run horizontally underneath the building. The removed VOCs would be treated using GAC, if necessary. A pilot system would be installed and additional soil borings would be completed in the area underneath the northeast corner of the plant and define the placement of vents for a full-scale system.

Duration: 1 year

Capital Costs: \$937,000

Annual O&M: \$204,000 + one time charge of \$19,000 for confirmatory sampling.

Total Costs: \$1,160,000

ALTERNATIVES FOR CONTAMINATED SOILS OUTSIDE THE BUILDING

Alternative OS - 1: NO ACTION

The no action alternative provides a baseline for comparison with other remedial alternatives. No corrective measures would be implemented for this alternative. There would be no reduction in the risks currently posed by the contaminated soils with this no action alternative. There are no costs associated with this no action alternative.

Alternative OS - 2: FENCE AND POST WARNING SIGNS

This alternative would consist of posting warning signs and fencing off all areas outside the building that have soil contamination exceeding the proposed cleanup level or are over RCRA

corrective action guidelines. This restricted area would further prevent unauthorized contact and restrict access to the contaminated area.

Duration: 30 + years
Capital Costs: \$10,000
Annual O&M: \$500
Total Costs: \$25,000

Alternative OS - 3: SOIL VAPOR EXTRACTION

This alternative would involve installing a SVE system that would remove VOCs from the various areas of soil contamination outside the building. Air injection vents and a combination of vertical and horizontal recovery vents would be installed in each area. The removed VOCs would be treated using granular activated carbon (GAC), if necessary. A pilot system would be installed and additional soil borings would be completed in the various areas outside the building to define the placement of vents for a full-scale system.

Duration: 1 years
Capital Costs: \$762,000
Annual O&M: \$552,000 + a one time sampling charge of \$26,000.
Total Costs: \$1,340,000

Alternative OS - 4: EX SITU VOLATILIZATION

This alternative would involve excavating the various areas of soil contamination outside the building. This soil would be placed on an impervious surface for treatment. VOCs would be removed through a series of pipes connected to a vacuum pump. The removed VOCs would be treated using granular activated carbon. Following successful treatment, the soil would be returned to the excavation. Implementation of this approach would require the designation of a Corrective Action Management Unit (CAMU) at the facility. This approach would involve installation of a pilot system to determine the final design of the full scale systems.

Duration: 1 to 2 years
Capital Costs: \$813,000
Annual O&M: \$32,000 + a one time sampling charge of \$24,000
Total Costs: \$901,000

Alternative OS - 5: LOW TEMPERATURE THERMAL TREATMENT

This alternative would require excavating the areas of soil contaminated outside of the building. This soil would be pretreated to remove any large debris. The soil would then be conveyed into the thermal treatment unit. The removed VOCs would be treated using a heat exchange and carbon adsorption unit. Following successful treatment, the soil would be returned to the

excavation. All residuals would be tested and disposed off site. Implementation of this approach would require the designation of a CAMU at the facility. This approach would involve an on site demonstration of the thermal desorption system and installation of a pilot system to determine the final design of the full scale system.

Duration: 3 to 4 months

Capital Costs: \$588,000

Annual O&M: \$3,028,000

Total Costs: \$1,597,333

Alternative OS - 6: EXCAVATION AND OFF-SITE DISPOSAL/INCINERATION

This alternative would require excavation of the areas of contaminated soil outside of the building. This soil would be sent to either a hazardous waste landfill or incinerator, depending on whether the excavated soil met the Land Disposal Restrictions (LDRs). The excavated areas would be backfilled with clean soil. Excavation of the soils would proceed in the same manner as described in Alternative OS - 4. Since this alternative would remove all of the waste, no long term O&M costs by EKCO would be associated with this option.

Duration: 3 to 4 months

Capital Costs: \$8,094,000

Annual O&M: \$0

Total Costs: \$8,094,000

EVALUATION OF THE PROPOSED REMEDY AND ALTERNATIVES

In order to determine the most appropriate remediation for the EKCO Housewares Facility, all the alternatives were evaluated against each other using the criteria outlined below:

1. **TECHNICAL CRITERIA** - The technical evaluation criteria include performance, reliability, implementability, and safety. Performance will be evaluated based on the effectiveness and useful life of the remedy. The remedy should be able to perform its intended function, such as containment, diversion, removal, destruction, or treatment. Reliability of the remedy is determined by evaluation of the O&M requirements and the O&M's demonstrated reliability. Implementability is evaluated through the constructability of the remedy and the time required for implementation. Safety is evaluated for each of the following groups: workers, nearby residents and local environments.

2. **HUMAN HEALTH CRITERIA** - The human health evaluation criteria addresses the ability of the remedy to mitigate the short and long-term potential for human exposure to hazardous constituents and protect human health during and after remedy implementation. Each alternative will be evaluated to determine the level and reduction of exposure to hazardous constituents.

3. ENVIRONMENTAL CRITERIA - The environmental evaluation criteria consists of assessing the effectiveness of a remedy in eliminating exposure pathways and any adverse effects on the environmentally sensitive areas associated with implementation of the remedy.

4. INSTITUTIONAL CRITERIA - The institutional evaluation criteria addresses all applicable and relevant institutional requirements such as State, Federal , local laws and public health statutes, standards, regulations, etc. for the design, operation and timing of each alternative.

5. COST ESTIMATE - While not considered to be an evaluation criteria, costs were determined for each alternative. Costs will be examined in comparison to other alternatives that achieve the criteria associated with the remedy. Consideration of cost consist of two categories: Capital costs including equipment, labor and materials to construct and/or design and Operating and Maintenance costs including costs to insure implementation, maintenance and monitoring.

GROUNDWATER ALTERNATIVES

Technical: Alternatives GW-2, GW-3, GW-4, GW-5, and GW-6 are expected to effectively remediate the aquifer and perform reliably. Pumping of the recovery wells will be sufficient to prevent off-site migration of contaminated groundwater. Constructability is not an issue for any of these alternatives. For each alternative, periodic maintenance and replacement of the groundwater recovery pumps will be necessary. Air stripper packing will need to be replaced periodically and the recovery wells will need to be rehabilitated approximately every 10 years with each alternative. Neither of the alternatives presents serious safety concerns, however, workers installing the pumps and piping would be required to wear protective clothing to avoid direct contact with contaminated soils.

Human Health: The deep water bearing zone is currently being used as a source for public drinking water by Ohio Water Service (OWS). OWS currently operated three wells that are located 2,000 feet northeast of the EKCO facility. Alternatives GW-2, GW-3, GW-4, GW-5, and GW-6 would prevent the migration of contamination from the EKCO facility to these wells. The well restriction program in Alternatives GW-2, GW-5 and GW-6 will also prevent the unauthorized use of groundwater that could draw contamination off-site.

Environmental: Alternative GW-2, GW-3, GW-4, GW-5, and GW-6 would prevent off-site migration of contaminated groundwater. VOC's in the recovered groundwater would be treated using the existing permitted air stripper and discharged through an outfall in accordance with the EKCO's NPDES permit. No adverse effects on the air or the surface water are expected. This system will be operated until target levels are reached. Although it is not possible to predict the amount of time required for the groundwater recovery system to reach the cleanup goals, it is predicted that alternatives GW-3, GW-4, GW-5, and GW-6 would require less time than alternative GW-2 due to the pulse pumping. It is predicted that alternative GW-6 would require even less time since air sparging would be in addition to the pulse pumping.

Institutional: Implementation of the well restriction program to prevent potential off-site migration of VOC contaminated groundwater will require the cooperation of the City of Massillon and Ohio Environmental Protection Agency (OEPA). The owners of the affected properties may legally oppose such an action.

Cost: Cost consideration exist between Alternative GW-2, GW-3, GW-4, GW-5 and GW-6. Alternative GW-2, groundwater extraction, has a total cost of \$4,509,000 of which \$99,000 is capitol. Alternative GW-3, GW-4 and GW-5, pulse pumping, has a total cost range between \$2,702,300 to \$5,643,200 of which capitol range from \$86,800 to \$183,800. Alternative GW-6, air sparging, has a total cost of \$3,259,700 of which \$235,200 is capitol and \$98,300 is O&M..

CONTAMINATED SOILS UNDERNEATH THE BUILDING ALTERNATIVES

Technical: VOC levels and air flow rate will be monitored at each vent and for the entire system to monitor VOC removal rates. During long term SVE operations, VOC levels tend to approach a steady state value. When this occurs, borings will be installed through the floor. Samples will be collected from each boring for VOC analysis. These results will be used to determine whether the soil objectives have been met. Siltation of the vents may occur during the extraction. When this occurs, it is usually necessary to drill a new boring. After the initial startup, SVE systems may be left unattended for long periods of time, except when replacement or regeneration of the carbon units becomes necessary. It is expected that the full scale system may only need to be operated for 1 year. Given, this time frame, only minor vacuum pump maintenance would be expected. Vacuum pumps and air compressors are readily available equipment. An air permit would be required prior to construction of the SVE system. Prior to shut down, confirmation sampling would be required to verify that the remediation objectives had been achieved.

Human Health: Implementation of the SVE system will pose little risk to human health, except by possible exposure to the drilling and installation crews. TCE and TCA may volatilize from the boring areas. The work crews will use the appropriate OSHA/NIOSH permissible exposure limits to determine the level of protection needed to protect human health. There would be no exposure to plant workers following initiation of system operations.

Environmental: Implementation of the SVE system would have little short term adverse environmental effects. This alternative will prevent potential recontamination of groundwater by soils underneath the building. The recovered VOC-laden air will be treated using granular activated carbon; therefore, no adverse effect on air quality would be expected.

Institutional: Discharges from the SVE system to the ambient air will require a discharge permit from OEPA. No institutional concerns would be expected with the implementation of this alternative.

Cost: Cost considerations exist between both SVE Alternative IS-2 and IS-3. Alternative IS-2 has a total cost of \$771,000 and similar O&M expenses as Alternative IS-3 which has a total cost of \$1,160,000.

CONTAMINATED SOILS OUTSIDE THE BUILDING ALTERNATIVES

Technical: With the exception of Alternatives OS-1 and OS-2, all of the soil remedial alternatives meet the corrective measures objectives. Alternatives OS-3, OS-4, OS-5 and OS-6 (with incineration as the disposal option) act to reduce the volume of contaminated material, but alternative OS-6 (with landfill as a disposal option) achieves no reduction of waste volume or toxicity of the soils. Alternatives OS-4, OS-5 and OS-6 all require excavation of the soils, which could potentially volatilize the VOCs in the soils. Additionally, if soil contamination extends to and/or underneath the building, the alternatives that involve excavation would become difficult to fully implement and would require SVE as an alternative. Alternative OS-4 and OS-5 would also require a large area at the site for treatment and a CAMU designation for disposal after treatment. All of the alternatives with the exception of alternative OS-1 and OS-2 are proven technologies for VOC-contaminated soils.

Human Health: Implementation of all of the alternatives with the exception of alternatives OS-1 and OS-2, will reduce the potential risk posed by exposure to contaminated soil. The potential exists for direct contact with VOCs contaminated soils during installation of SVE or excavation of contaminated areas. Work crews would use the appropriate OSHA/NIOSH permissible exposure limits to determine the level of protection needed to protect human health. There would be no exposure to plant workers or the public following initiation of SVE system operations, or excavation.

Environmental: All of the alternatives except for OS-1 and OS-2 would be protective of the environment. The remaining alternatives would reduce the level of VOCs in soils and therefore reduce and ultimately eliminate impact to groundwater. Alternatives OS-3, OS-4 and OS-5 would reduce waste volume.

Institutional: Discharges from the SVE system to the ambient air will require a discharge permit from OEPA. Alternatives OS-3, OS-4 and OS-5 all require a CAMU. Since this process has recently been developed, it is uncertain what requirements might be made for design of the contaminant pad and for the treated soils to be returned to the excavations. Alternative #6 would not result in reduction of the toxicity or volume of waste unless it is incinerated. A large number of trucks would be required to transport the excavated soil, potentially raising community concern.

Cost: Cost considerations exist between Alternatives OS-3, OS-4, OS-5 and OS-6. Total cost for Alternative OS-3, SVE, is \$1,340,000. Total cost for Alternative OS-4 and OS-5, excavate

and treat, are \$901,000 and \$1,597,333 respectively. Total cost for Alternative OS-6, excavation and incineration, is \$8,094,000.

PROPOSED REMEDY FOR GROUNDWATER

Based on the evaluation of the RFI/CMS and the above criteria. U.S. EPA is proposing Alternative GW-6 for the groundwater remediation. The corrective action objectives for groundwater are as follows:

- . Achieve regulatory standards (MCLs) for organics found in all on-site aquifers.
- . Continue the prevention of migration of contamination from the site.
- . Achieve regulatory standards (MCLs) for organics found in any portion of the deep sand and gravel layer (which serves the OWS wells), which is adjacent to the site and has been impacted by it.

Six alternatives for groundwater were developed for detailed analysis. Alternative GW-1 (no action) does not meet the corrective measures objectives for groundwater. Alternatives GW-2 (installation of additional recovery wells and constant pumping of wells W-1 and W-10) and GW-3 (installation of additional recovery wells and pulse pumping of wells W-1 and W-10) were developed given the assumption that additional recovery wells were necessary to maintain hydraulic control of the shallow and intermediate water-bearing zones following well rehabilitation interim remedial measures activities. Hydraulic control is currently being maintained. Both Alternatives GW-2 and GW-3 would directly remediate shallow zone contamination.

Alternatives GW-2, GW-3, GW-4, GW-5 and GW-6 meet the corrective measures objectives in functionally the same manner. Each would control the shallow, intermediate and bedrock water-bearing zones using recovery wells W-1 and W-10. Alternatives GW-3, GW-4, GW-5, and GW-6 refine this approach by incorporating pulse pumping of the bedrock recovery wells. The existing data suggest that pulse pumping may serve to increase the level of VOCs in the recovered groundwater. This in turn may lead to a reduction in the time required to reduce site groundwater to regulatory standards. Alternative GW-2, therefore, is not recommended.

Alternative GW-4 will only indirectly result in remediation of the shallow zone. Alternatives GW-3, GW-5, and GW-6 will result in enhanced VOC removal rates from the shallow groundwater contamination more aggressively; however, a preliminary analysis of shallow zone contaminant data indicates that the additional amount of VOCs removed would be less than 1 pound per day. With alternative GW-6, air sparging would be used to reduce VOC levels in the shallow water-bearing zone. Alternative GW-6 requires that soils alternative GW-3 (SVE operation) be

selected. It is projected that alternative GW-6 will result in the largest increase in VOC recovery rates; however, this will be determined during a pilot test. Based on all these criteria and considerations, alternative GW-6 was therefore chosen.

PROPOSED REMEDY FOR SOILS UNDERNEATH THE BUILDING

Based on the evaluation of the RFI/CMS and the above criteria, U.S. EPA is proposing alternative IS-2 for the contaminated soils underneath the building.

Three alternatives were developed for soils underneath the building. Alternative IS-1 (no action) does not meet the corrective measures objective for soils, whereas alternatives IS-2 (vertical SVE) and IS-3 (horizontal SVE) would both meet the objectives. Alternatives IS-2 and IS-3 meet the corrective measures objectives in functionally the same manner. With alternative IS-2, vents would be installed from within the building, through the floor. With alternative IS-3, the vents would be installed from outside the building. Alternative IS-3 is expected to have less potential impact on the facility operations, but alternative IS-2 is more cost-effective. Based on all criteria and conditions, alternative IS-2 was therefore chosen.

PROPOSED REMEDY FOR SOILS OUTSIDE THE BUILDING

Based on the evaluation of the RFI/CMS and the above criteria, U.S. EPA is proposing Alternative OS-3 remedy for soils outside of the building.

Of the six alternatives, Alternatives OS-1 and OS-2 do not meet the corrective measures objectives, whereas the remaining alternatives do meet the objectives. Alternatives OS-3, OS-4, OS-5, and OS-6 (with incineration as the disposal option) act to reduce the volume of contaminated material, but alternatives OS-6 (with landfill as the disposal option) achieves no reduction of waste volume or toxicity of the soils. Alternatives OS-4, OS-5, and OS-6 all require excavation of the soils, which could potentially volatilize the VOCs in the soils. Additionally, if soil contamination in Areas 1, 2, or 3 extends to and/or underneath the building, the alternatives that involve excavation would become difficult to fully implement and would require SVE. SVE is the recommended alternative for Area 4 soils underneath the building and could be implemented in Areas 1, 2, and 3, if necessary. SVE is also a well proven technology for VOC contaminated soils.

PUBLIC PARTICIPATION

U.S. EPA solicits input from the community on all of the alternatives evaluated in the CMS and U.S. EPA's proposed combination of soil and groundwater remedial alternatives. U.S. EPA has set a public comment period from June 24, 1996, until July 23, 1996, to encourage public participation in the selection process. The comment period includes a public meeting at which U.S. EPA will present the SB and accept both oral and written comments.

The public meeting is scheduled for 7:00 p.m., July 15, 1996 and will be held at the -----

The Administrative Record is available at the following locations:

????????

and

U.S. EPA, Region 5
Waste Pesticides and Toxics Division Records Center
77 West Jackson Boulevard, 7th Floor
Chicago, Illinois 60604-3590

After consideration of the comments received, U.S. EPA will select the remedy and document the selection in Response to Comments (RTC). In addition, comments will be summarized and responses provided in the RTC. The RTC will be drafted at the conclusion of the public comment period and incorporated into the Administrative Record. To send written comments or obtain further information, contact:

Cheryl Allen
Community Involvement Coordinator
U.S. Environmental Protection Agency
77 West Jackson Boulevard, P-19J
Chicago, Illinois 60604
(312) 353-6196
1-800-621-8431

ATTACHMENT II
U.S. EPA RESPONSE TO COMMENTS

Overview

On August 23, 1996, U.S. EPA made the Statement of Basis and the Administrative Record available for public review and comment at the public library in Massillon, Ohio and U.S. EPA's, Waste, Pesticides, and Toxics Division Record Center. A 30-day public comment period was held from August 26, 1996, through September 26, 1996.

The purpose of this Response to Comments is to document the U.S. EPA's response to comments received during the public comment period. All comments received by U.S. EPA were reviewed. Comments have been reproduced and the U.S. EPA responses provided below. All comments received are contained in the Administrative Record.

Community Involvement and Concerns

American Home Products Corporation (AHPC) and Consumers Ohio Water Company (COWC) were the only source of comments during the public comment period. AHPC supports the chosen remedy but disagrees with statements found within the approved RCRA Facility Investigation Report, the approved Corrective Measures Study and the draft Statement of Basis. The comments submitted by AHPC do not affect the proposed remedy and are disagreements with U.S. EPA's stated view of site conditions.

COWC expressed concern that the hydrogeology of the buried river channel area is not accurately presented by U.S. EPA. COWC also suggested a groundwater monitoring program for the EKCO facility. The comments are reproduced and responded to below.

U.S. EPA Response to Comments

The comments below are summarized from letters received from American Home Products Corporation and Consumers Ohio Water Service.

COMMENTS RECEIVED FROM AMERICAN HOME PRODUCTS CORPORATION

Comment 1: "American Home Products Corporation agrees with the selected remedial alternatives as they are outlined in the Draft Statement of Basis (SB) and the final Corrective Measures Study (CMS) for the EKCO Housewares facility in Massillon, Ohio."

U.S. EPA Response: U.S. EPA believes that the selected remedy will be protective of human health and the environment and will meet the objectives outlined in the Statement of Basis.

Comment 2: AHPC believes the following statements in the draft SB should be revised in order to more accurately represent the

findings of the RCRA Facility Investigation (RFI) and the CMS (Figures from the Attachment A of the final CMS are also attached):

Page 2, Paragraph 5--The results of these studies are as follows: ... A nearby municipal well was contaminated.

Page 5, Paragraph 4--In September 1987, a groundwater quality assessment for the facility was conducted ... sample all on-site wells and the contaminated municipal well (OWS-4)...

AHPC also states that the source of the municipal well contamination has never been determined and that no data have been collected that indicate any off-site migration of contaminated groundwater is occurring or has occurred. In addition, EKCO states that the recovery wells (W-1 and W-10) currently draw water from the deep unit toward the site preventing off-site migration of groundwater and that the wells have been in production since 1940s. EKCO concludes that the historical pumpage of these wells would have induced flow conditions similar to current conditions at the site and prevented off-site migration of groundwater.

U.S. EPA Response: While the RFI may not have discovered the source of the contamination found in the municipal, the contamination in the well is a proven fact. The only addition to the contamination sources identified at the EKCO facility is found at Price Brothers' facility which appears to be a more recent spill due to the ratio of breakdown products and parent chemical constituent. The EKCO facility remains a possible source of the contamination found in the municipal well. The RFI, CMS, and SB does not specifically state that EKCO is the source of the contamination nor does it point out that the constituents found in the contaminated well are similar to those found at and near the EKCO facility. The statements are neutral, consequently, the documents do not need to be corrected.

Comment 3: "Figure 4 (attached) shows that the extent of the glacial valley from which OWS draws its groundwater extends throughout the industrial Massillon area. It can be seen in this figure that within the glacial valley there are abundant potential sources of VOCs to the groundwater. Industrial facilities located within the glacial valley are much more likely sources of the contamination found at the OWS-4 well than the EKCO facility, which is located west of the glacial valley and has a pumping system that pumps significantly more water than is necessary to prevent off-site contaminant migration."

U.S. EPA Response: The facilities identified on the map do not have RCRA identification numbers and are not known to have handled the constituents that have contaminated OWS-4. However, this fact does not preclude the facilities of having been responsible for unknown contaminant releases to the environment.

In addition, it appears that the TCE release found at or near the Price Brothers facility more recent than the releases documented at the EKCO facility. Thus, this release may be too recent to have been the cause of the contamination found in the municipal well and the other facilities are located in areas that are hydrogeologically unlikely to contribute contamination to the municipal well.

Comment 4: "Page 7, Paragraph 3 -- On-site recovery wells do not have any effect on the deep sand gravel layer that overlies the bedrock. The flow system in this interval is governed by the OWS wells, which pull the groundwater to the north.

The attached Figures 1, 2 and 3 from the final CMS show that the EKCO recovery wells (W-1 and W-10) do have an impact on the deep unit east of the facility. These figures show that the EKCO recovery wells induce a significant gradient from the deep unit east of the facility back toward the site. These figures clearly show that the EKCO recovery wells prevent any off-site migration and also pull groundwater from the deep unit toward the site.

Incorporation of these CMS figures and findings into the SB would provide a more accurate and complete representation of the conditions at and around the EKCO Housewares facility."

U.S. EPA Response: Figures 1, 2, and 3 from the final CMS are part of Appendix A in which EKCO disputes the findings and conclusions of the RFI and CMS. The RFI concluded that the on-site recovery wells do not have any effect on the deep sand gravel layer that overlies the bedrock and that the flow system in this interval is governed by the OWS wells, which pull the groundwater to the north. U.S. EPA stands by its initial conclusion.

COMMENTS RECEIVED FROM CONSUMERS OHIO WATER COMPANY

Comment 1: The Proposed Statement of Basis (SB) for EKCO Housewares, Incorporated, Massillon, Ohio contains the following, "As a result of the pumping, the groundwater in the shallow (Figure 1-8), intermediate (Figure 1-9), and bedrock (Figure 1 - 10) water-bearing zones under the entire site is flowing directly toward production wells W-1 and W-10, and does not appear to flow

off-site. Groundwater in the deep sand and gravel water bearing unit flows directly north toward the pumping OWS production wells OWS 1, 2, and 3 (Figure 1-7)."

COWC does not believe this is an accurate portrayal of ground water flow in the area under pumping and non-pumping conditions. COWC believes that natural ground water flow subparallels the flow of the Tuscarawas River under non-pumping conditions (Figure: Model Grid and Static Piezometric Map). COWC also believes pumping conditions are different and ground water flows directly into OWS 1, 2, and 3 from the surrounding area (Figure: 1 and 5 Year Wellhead Protection Areas).

U.S. EPA Response: The figure "Model Grid and Static Piezometric Map" and the figure "1 and 5 Year Wellhead Protection Areas" were created for the Well Head Protection Program (Section 1428 (A) and (B) of the Safe Drinking Water Act). The "Model Grid and Static Piezometric Map" lays out the grid area for which the groundwater model was run. The resulting map is the "1 and 5 Year Wellhead Protection Areas" map. It appears that the model did not utilize the pumping of Wells 1 and 10 located at the EKCO facility. Consequently, the "1 and 5 Year Wellhead Protection Area" map does not correctly portray the actual one and five year capture zones for COWC's wells 1, 2, 3, 5, 7, 8, and 9. U.S. EPA further believes that the remedial actions proposed for the facility will prevent off-site migration of the contaminants in the aquifers.

COWC comment 2: "COWC agrees that contamination is flowing from the EKCO site and contamination at R-12 is attributed to the EKCO spill. COWC can not positively identify the location of the leading edge of the contamination plume. COWC has analyzed wells OWS 1, 2, and 3 on a routine basis since October, 1987 and has detected the following: vinyl chloride (VC); 1,1-dichloroethane (1,1-DCA) and cis 1,2-dichloroethylene (cis 1,2 DCE) (Figure 1).

U.S. EPA Response: The label for Figure 1 states that the information reflect well OWS 1 only.

COWC Comment 3: COWC agrees with the statement that high levels of TCE in S-12 are a separate and unrelated event. Aerial photographs from 1965, on file with the Stark County Engineers, show the presence of an unidentified structure(s) in the general location of wells S-12 and R-12. The purpose of the structure(s) is not known to COWC and the structure(s) may no longer exist. COWC believes that the purpose of the structure(s) and the activity conducted at the site needs to be investigated.

U.S. EPA Response: The RCRA program does not have authority to investigate the area where S-12 and R-12 are located.

Comment 4: COWC further believes that the absence of breakdown products may be not entirely dependent upon time but may reflect a geochemical environment that is aerobic. Halogenated aliphatic compounds tend to persist in aerobic environments (Domenico and Schwartz). COWC believes that there are two separate events taking place at R-12, S-12 and that both events are potentially harmful to OWS 1, 2, and 3. Since the presence of contamination is an established event and the migration of the contamination towards wells OWS 1, 2, and 3 has the potential of affecting our source of drinking water, COWC requests the following:

Dedicated pumps be installed at ten wells; R-12, S-12, I-13, I-11, I-4, R-4, I-9, I-8, I-8D, and OWS-4.

VOC monitoring be conducted at these wells on a quarterly basis and analyzed in an approved lab with COWC's approval. All analyses be made available to COWC.

Test for Cd, Cr, and Pb in Newman Creek and the above wells. Suspend metal testing if elevated metal levels are not detected. Continue metal testing if elevated levels are detected in any of the wells.

These requests reflect what COWC believes is needed at a minimum to help protect the ground water resources that are the source of drinking water for the 75,000 customers of COWC.

U.S. EPA Response: On January 9, 1995, the Ohio Environmental Protection Agency notified American Home Products that the EKCO lagoon had been closed in accordance with the approved closure plan and Rules 3745-66-12 through 3745-66-15 of the Ohio Administrative Code. Furthermore, on November 3, 1993, the U.S. EPA approved with modification the RFI conducted at the facility. In the approval U.S. EPA directed AHP to state that the lagoon is not a *continuing* source of metals..." to the environment. Thus, further monitoring of the groundwater for metals is deemed not to be needed to protect human health and the environment.

EKCO investigated the hydrogeology as part of the RFI (EKCO-136). The geology and associated groundwater is complicated which resulted in different interpretations expressed by U.S. EPA, EKCO, COWC, and Price Brothers. The differences were resolved in the RFI Report and the Corrective Measures Study (Approved March 30, 1994) was based on the interpretation of the geology and groundwater found in the RFI Report. Based on U.S. EPA's

understanding of the geology and groundwater at and near the EKCO facility, the requested monitoring program appears not to provide greater protection to human health or the environment.

EKCO Housewares, Inc.
Massillon, Ohio
OHD 045 205 424

<u>Document Number</u>	<u>Date</u>	<u>Description</u>
EH1 - 179	09/10/96	Transcript, U.S. EPA Hearing, In Re: EPA Proposes a Cleanup Plan for Contamination at EKCO Housewares, Inc., Tuesday, September 10, 1996, Massillon Municipal Government Center, Massillon, Ohio.
EH1 - 180	09/21/96	Letter from Consumers Ohio Water Company to U.S. EPA providing comments on the U.S. EPA Statement of Basis.
EH1 - 181	09/24/96	Letter from American Home Products Corporation to U.S. EPA providing comments on the U.S. EPA Statement of Basis.
EH1 - 182	06/30/00	Letter from Roy F. Weston, Inc. to U.S. EPA providing mass removal calculations, QAPP Addendum for Geoprobe soil sampling, and 1999 Groundwater Monitoring Report.
EH1 - 183	08/04/00	Letter from U.S. EPA to EKCO Housewares, Inc. approving with modifications, the QAPP Addendum for Geoprobe soil sampling.
EH1 - 184	08/30/00	Letter from American Home Products Corporation requesting clarification on U.S. EPA's approval with modifications of the QAPP Addendum for Geoprobe soil sampling.
EH1 - 185	09/06/00	Letter from Roy F. Weston, Inc. to U.S. EPA providing a response to U.S. EPA comments in the August 4, 2000, approval with modifications letter.
EH1 - 186	09/15/00	Letter from U.S. EPA to American Home Products Corporation responding to the August 30, 2000 and September 6, 2000 letters.
EH1 - 187	11/22/00	Letter from Roy F. Weston, Inc. to U.S. EPA submitting the Soil Investigation Report.
EH1 - 188	12/13/00	Letter from U.S. EPA to American Home Products Corporation providing comments and modifications to the Soil Investigation Report.

The Administrative Record for EKCO Housewares, Incorporated will be located at:

*U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604*

EH1 - 179

U.S. EPA HEARING

IN RE: EPA PROPOSES A CLEANUP PLAN FOR CONTAMINATION AT
EKCO HOUSEWARES, INC.

Tuesday, September 10, 1996,
7:05 o'clock, p.m.,
Massillon Municipal Gov't Center,
Massillon, Ohio.

IN ATTENDANCE:

U.S. Environmental Protection Agency;
By: Robert Smith, Project Manager,
and
Cheryl L. Allen, Community Involvement
Coordinator,
Region V,
Office of Public Affairs (P-195),
77 West Jackson,
Chicago, IL 60604.

PROCEEDINGS

MS. ALLEN: I would like to thank you all
for coming. I'm Cheryl Allen, the Community
Involvement Coordinator with USEPA. This is
Bob Smith. He's the Project Manager with
USEPA, and I want to thank you for coming out
this evening.

We're here to get the comments on the
proposed cleanup for Ekco Housewares. Now we
started the comment period on August 26 and it
concludes on September 26, so that's the
purpose of tonight's meeting is to get verbal
comments from you on the proposed plan cleanup
which is summarized in this Fact Sheet.

Now the huge document is how many pages,
Bob?

MR. SMITH: About 30 pages.

MS. ALLEN: About 30 pages is located in
the Information Repository at the library here
in town, so if you want to go and peruse that
and look at the charts and graphs and
everything, feel free to be welcome to do
that.

Like I said, we have — this is the

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comment period for this site, and for those
purposes, we have a Court Reporter here who is
going to be taking down all of your questions
and your comments, and we encourage you to
bring forth as many questions and comments you
can think of this evening. That's the purpose
of this meeting is to get any questions or
comments out that you have about the proposed
plan or any of the other alternatives that are
listed in the Statement of Basis.

After we get all the comments in the mail
and through this meeting and I get —
sometimes I get comments through E-Mail, I get
comments over the phone, we take all those
comments and compile them into what is called
a — this is a little different because I work
in the Superfund and their documents are
different, their document is called Response
to Comments, and once we get all that compiled
and answer all your questions, we'll put that
in the information Repository also.

So with that, I'm going to introduce Bob
and he's going to go through all the
alternatives, talk about the Statement of
Basis, then we're going to open up to

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questions, and after that we're going to open
up to comments, so with that, Bob.

MR. SMITH: I'm Robert Smith. I am the
new Project Manager for this site, and I'll be
taking this project through the Statement of
Basis, through the final decision, into the
corrective measures implementation which would
be the actual site of remediation, and so at
this point what I'd like to do is pretty much
briefly discuss what is found in the Statement
of Basis, explain some of the ideas of what's
behind it, a little bit of background,
including what USEPA did at the site, and what
this document, the proposed Statement of
Basis, is, where we're going from here after
tonight and so forth.

One thing I'd like to say is that the
Repository, while it's supplied with two
copies of the Statement of Basis, that did not
have the figures in it and I corrected that
problem, so if any of you have gone to the
library before tonight, you may want to
revisit it because those Statement of Bases
now have the correct diagrams and maps
included.

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What we have now is this document called the Proposed Statement of Basis, and basically it is the conclusions of our Corrective Measure Study. Much of this I'll get into in a little bit more detail, but what we're doing is proposing a cleanup at the Ekco facility, and, again, what we're doing tonight is presenting this to the public and allowing you to give your comments or have a chance to ask questions about this cleanup or what we've done out there, and the comment period will extend beyond tonight if there's any written comment or telephone comment, fax comment, whatever, and what we will do is review the comments, and then if there's any major questions or maybe comments — well, we're going to answer every single one of them, but if there's something that will change our proposal, well then that's something we'll be considering. So what we're proposing tonight is not the final selected remedy, but it's our proposal.

Briefly to start out, our proposed remedy is found in this Fact Sheet that's presented up here, and if you each have a copy of the

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made shell casings for the Military during World War II. During this time, there was a surface impoundment that was operated at the facility, and the surface impoundment generally is the lagoon in which waste is placed for either disposal or treatment.

In 1954 Ekco began coating cookware manufactured at the facility, and from 1954 to 1960 Ekco used solvents, primarily Trichloroethene, which is abbreviated TCE, or 1,1,1-Trichloroethene, which is abbreviated 1,1,1-TCA, and they used these solvents in their cleaning process prior to the coating.

And between 1979 and 1980 a major solvent spill of unknown quantity occurred near the process water well which is Well 10. That's also found in Map No. 3. Neither the exact location or the extent of the spill was documented.

A second spill of 50 gallons of 1,1,1-TCA was reported to have occurred in 1992 on the west side of the building. In 1984, an analysis of on-site water well was conducted for volatile organic compounds which is abbreviated VOC. The results indicated in the

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Fact Sheet, there's also a stack of maps and diagrams that were rather helpful to look at while we're talking about this, but to get in your mind before we go through all the more detailed information, the remedy consists of air sparging and groundwater extraction and treatment, groundwater monitoring, well permanent restrictions and soil vapor extraction. This certainly may not mean anything to you at this point, but we'll be going through this in a little bit more detail hopefully that you'll understand it, and if not, you know, you'll have the opportunity to ask questions about this.

The first map that I included on this is the map of the facility. It's about 13 acres, and it's located in a largely urban and industrial area, and there's marked rural areas and large portions of open space to the northwest. It's about 1,500 feet west of the Tuscarawas River, and it is bordered by two sides by railroad tracks and bordered to the north by Newman Creek.

The facility started in 1940 manufacturing aluminum and stainless steel cookware, and it

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presence of TCE and 1,1,1-TCA found in the groundwater, and I have maps which — probably about Maps 5 through 7 which show generally some of the groundwater contamination, the location, and some of the big concentrations. The findings were that the VOC were detected in shallow intermediate and bedrock monitoring wells, that a nearby municipal well was contaminated, and the VOC source area was identified in four locations such as the areas in the southwestern end of the plant, the tank area at the northern end of the plant and in the sump at the production well.

Then in 1989, USEPA and Ekco signed a Consent Agreement which is an administrative order of consent under 3008H of the Resource Conservation and Recovery Act, which is called RCRA is our acronym for that program. It required a RCRA facility investigation which is an investigation where we go out to the site to try to delineate contamination, to try to find rate and extent of contamination, and what the contaminants are and required Corrective Measure Study. Once the extent of the contamination is found, we look through

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the possible remedial actions that can be taken at the site to take care of the problem. Field work started in April of 1991, and the final R5 report was approved in 1993, and by March, 1994, the Corrective Measures Study was finalized and approved, and the contents of the Statement of Basis, which is found in the Repository, documents and summarizes the Corrective Measure Study.

And just before we go into some of the other findings of the facility investigation, part of the investigation included the definition of the environmental setting which includes Geology and the hydrogeology. As far as the Geology is concerned, the Ekco facility is found on a western flank of a buried glacial valley and the valley is filled with glacial sediments. On the western end of the facility, the glacial sediments are only 20 feet thick, and on the eastern portion of the site, the glacial sediments extend greater than 250 feet in thickness. The glacial sediments are divided into seven distinct layers of unconsolidated material and three highly permeable sand and gravel units are

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contamination has migrated off site. It's estimated that 3,500 cubic yards of soil contamination exists under the buildings and 4,899 cubic yards of contamination exists outside of the building on the property. Our going around and monitoring has demonstrated that the groundwater adjacent to the facility has been contaminated with VOCs from the chlorinated ethene family and chlorinated ethane family. Members of both these groups break down the environment through inorganic deep chlorination and other mechanisms to create successively lighter compounds. Groundwater contamination is found in the shallow intermediate and bedrock water bearing zones.

Once the site was characterized, the data are presented and interpreted, and then the Corrective Measure Study or CMS is performed, and as I stated, the CMS is when we look through all the potential corrective measures, study them, and based on the site, the contamination, the Geology, so forth, we propose corrective measures for the facility, but, also, part of the Corrective Measure

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found in the glacial units.

Below the glacial sediments are bedrock and the bedrock consists of four interbedded layers, most importantly sandstone unit, which is primarily the water-bearing unit in the bedrock. The rock units are divided into four distinct permeable hydrostat graphic units which include the shallow sand and gravel, the intermediate sand and gravel, the deep sand and gravel, and sandstone bedrock.

Ekco uses two sandstone bedrock production wells which are wells W-1 and W-10 and they pump a total of approximately 600 gallons per minute to provide water for the manufacturing facility. The Ohio well service pumps the three production wells intermittently from deep sand and gravel up to 2800 gallons a minute to provide water to the City of Massillon.

Generally, the RCRA facility investigation, RFI, concluded that the main sources of the VOC contamination are located at recovery well W-10, the tank area north of the building, and groundwater on the site is contaminated, and the groundwater

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Study includes a risk assessment, and the risk assessment defines risk to human health in the environment, and the purpose of this risk assessment was to determine the present and future potential risks to public health in the environment posed by the facility based on existing conditions. The objective was to assess health risks to a hypothetical future on-site resident from exposure to the VOCs in the upper and lower bedrock units. The baseline risk assessment evaluated potential risk of human health giving no action in remediated groundwater or soil at the facility, that is cessation of the testing groundwater pump program, and this would be a worse case scenario.

The chemical constituents of concern at this facility consist of carcinogenic and noncarcinogenic compounds found in the groundwater. And the sum of the potential risk for carcinogen indicated the following cumulative risk for exposure to carcinogens or noncarcinogens under worst case exposure scenarios, and that is worst cases one times ten negative two, which is one in a hundred

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1 risk of getting cancer in the shallow or the
2 intermediate bedrock unit, and one times ten
3 in the negative third, which is one in a
4 thousand in the lower bedrock unit. For both
5 cancer and noncancer risk, the largest
6 contributor is by chemicals TCE, 1,1,1-DCE,
7 and vinyl chloride.

8 For the Ekco facility, immediate cleanup
9 standards have been established which
10 corresponds to maximum contaminant levels or
11 MCLs. MCLs are federally enforceable drinking
12 water standards developed in the Safe Drinking
13 Water Act and this is 40CFR141, Subpart B.

14 In the contaminants found in the
15 groundwater above, the respective of MCLs were
16 PCE, TCE, 1,1-DCE, 1,2-DCE, vinyl chloride and
17 1,1,1-TCA, and these are initial contaminants
18 released to the environment under breakdown.
19 Of course, they have long chemical names
20 for — I don't know if everybody here has a
21 scientific background or whatever, but it's
22 easier to go through the abbreviations.

23 So the conclusions were that the
24 contaminated soils that needed to be
25 remediated fall in the two categories, the

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1 over pretty quick, but what I'd like to do is
2 go through, in simple terms, our evaluation of
3 the proposed remedy, and then give you our
4 proposed remedy. And if you'd like to have a
5 lot more detail, then, again, go to the public
6 library and look through the documents. If
7 you have any questions, I will provide my
8 phone number.

9 When we take a look at the alternatives,
10 there are five criteria that we use to
11 evaluate the alternatives. The first one is a
12 technical criteria. In simple terms, it's
13 just performance evaluation, how effective is
14 the remedial action? Does it meet our
15 objectives of cleanup?

16 Our human health criteria is number two.
17 We want to mitigate human exposure. What is
18 the risk of human exposure to the
19 contamination?

20 Our third one is environmental criteria.
21 We want to eliminate any release to the
22 environment, clean it up, remove it, treat it,
23 whatever the case may be. So that there won't
24 be a continuous release to the environment,
25 clean it up once and for all.

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1 soils underneath the Ekco Manufacturing
2 building and soils outside the building. The
3 contaminants of concern for the soils are TCE
4 and 1,2-DCE. The estimated amount of soil to
5 be remediated beneath the building is 3,500
6 cubic yards of VOC contaminated soil, and the
7 soil outside of the building that needs to be
8 remediated is estimated at 4,900 cubic yards
9 of VOC contaminated soil, and the calculated
10 soil cleanup levels for those two contaminants
11 are for TCE, one milligram per kilogram, which
12 is one part per million, and for 1,2-DCE is
13 ten milligrams per kilogram, which is ten
14 parts per million.

15 The Statement of Basis includes a summary
16 of the alternatives. There are quite a few
17 alternatives here. For the groundwater, there
18 are six alternatives. For the inside soil,
19 which would be below the building, there are
20 three alternatives. For the outside soil,
21 there are six alternatives. I feel that it's
22 probably best to look at the document in the
23 library because if I were to go through this,
24 it would just turn into a college lecture, and
25 I'm sure everybody's eyes would start glazing

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1 Institutional criteria is number four.
2 Basically that's State, Federal, local laws,
3 public health standards, statutes, and
4 basically it can be as simple as putting up a
5 fence or looking at what the State of Ohio
6 requires or what the Federal Government
7 requires.

8 The fifth one, and for my program the
9 Resource Conservation Recovery Act, RCRA, we
10 don't look at it in the same light as
11 Superfund does, and that's cost estimate. For
12 us, we look at the cost estimate, but it's
13 mostly important if there's two or more
14 alternatives and you get to the same end
15 point, and if one is significantly cheaper
16 than another, then we go with the cheaper one.
17 In the Superfund, it's quite a bit different,
18 but we do look at the cost estimate, and if
19 relevant to our program, it plays a part.

20 So finally we get to our proposed remedy.
21 Our proposed remedy, which is found in the
22 Statement of Basis, USEPA is proposing
23 alternative groundwater No. 6, GW-6, as our
24 choice. That includes air sparging of shallow
25 zone and pulse pumping of W-1 and W-10,

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groundwater recovery, air stripping and groundwater monitoring. The air sparging of the channel zone and pulse pumping of W-1 and W-10, groundwater recovery, air stripping and groundwater monitoring would include the installation of additional recovery walls and pulse pumping of the existing bedrock units. Contaminated bedrock groundwater would be recovered from using W-1 and W-10, and part of that is discussed in alternative GW, the specifics of the pulse pumping. And for this alternative, air sparging will be implemented in conjunction with soil. The remedial action is described in alternative OS3.

Air sparging. You're probably asking yourself "What's air sparging?" It's a technology that mechanically introduces air below the water table using compressed air to feed a series of injection wells. VOCs that are dissolved in the groundwater volatilizes into the air as the air bubbles move through the groundwater, and the VOC laden air stream is then collected from the vadose zone, which is the zone above the water table using the soil vapor extraction system, which is SVE.

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So this proposed remedy we feel will achieve our regulatory standards, which are the MCL, for organics found on all site aquifers and would continue the prevention of migration of contamination from the site and would achieve regulatory standards which are MCLs for organics found in any portion of the deep sand and gravel layer which serves the adjacent Ohio service wells.

The duration for this would be 30 years, maybe even longer, for everything except the air sparging, which is expected to be completed in two years. The capital cost is about \$235,000. The annual operation of maintenance would be about 185,000 for the first and second year and then will go down to approximately \$98,000 per year, and the total cost over the life would be \$3,259,000.

For the inside soil which is found beneath the facility, alternative IS2, soil vapor extraction, SVE, treatment is proposed, and this alternative would consist of the installation of the soil vapor extraction system that would remove VOCs from the soil underneath the northeast corner of the

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One thing that's not mentioned in the Statement of Basis, though, is that, you know, the introduction of air also aided in some sort of biodegradation, but that's kind of an add and plus, but, anyway, this alternative proposes that the operation of the air stripper would continue without modification. There's an air stripper working at the site at this time, and the air sparging is estimated to be performed for two years. Groundwater well permits and usage would be restricted in this area the pulse pumping of W-1 and W-10.

As far as remediation of sites is concerned, we've been doing this for a while and we've been looking at the results of continuous pumping or pulse pumping for certain ways to try to get as much contamination out of the ground as possible, and it appears that pulse pumping works probably better than continuous pumping, so that basically means pumping for a while in the well, letting it recover, and then pump again, and it seems that more contaminants are extracted from the ground using that particular method.

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building. The SVE removes the VOCs from the soil by mechanically drawing air through soil pore spaces. Air injection vents and vertical or horizontal recovery vents would be installed into the soil through the floor of the building. The volatilized VOCs would then be removed and treated using granular activated carbons, if necessary. The pilot system will be installed. An additional soil borings will be completed to determine the scale of the system in the area beneath the northeastern corner of the plant and to find the placement of the air vents for a full scale system, and that's possibly a one-year duration. Capital cost, about \$24,000. Annual operation of the maintenance cost, about 228,000, plus a one-time charge of \$19,000 for confirmatory sampling. A total cost projected to be \$771,000.

For the outside soils, alternative OS3, which is soil vapor extraction, is proposed, and this alternative would involve the installation of an SVE system that would remove VOCs from the various areas of soil contamination outside the building, air

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1 injection vents, and a combination of vertical
2 and horizontal recovery vents would then be
3 installed in each area. To remove the VOCs
4 would be treated using granular activated
5 carbon, if necessary, and a pilot system would
6 be installed, and additional soil borings
7 would be completed in the various areas
8 outside the building to define the placement
9 of vents. The duration is probably one year.
10 Capital cost, 762,000; annual operation of
11 maintenance would be about 552,000, plus a
12 one-time sampling charge of about \$26,000.
13 Total cost would be \$1,340,000.

14 Where we go from this point would be to
15 take any and all comments generated this
16 evening or during the duration of the comment
17 period. Depending on what the comments are
18 and how it affects our proposed remedy, you
19 know, we will either modify or change as
20 needed our proposed plan, our proposed
21 remedial plan. The next step would be that I
22 would write a final decision based on the
23 Statement of Basis and comments and conclude a
24 Response to Comments. From that point, we
25 would go into negotiations with Ekco and have,

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1 No questions?

2 MR. SERENO: I guess I've got one.

3 MS. ALLEN: Could you state your name,
4 please?

5 MR. SERENO: Dave Sereno with the
6 Repository Newspaper.

7 How far away did the contamination get?
8 When you said the contamination has gone
9 outside of the plant there, do you know how
10 far? I notice that Ohio Water is not too far
11 away. Is there any --

12 MR. SMITH: One of the Ohio Water wells
13 was impacted. As far as distance, to be quite
14 honest with you, I couldn't tell you how much
15 in feet or how far away from the facility. I
16 did include those maps in that handout to give
17 a general idea. I know that there probably
18 isn't a scale in there, I'm not sure, but to
19 be quite honest with you, and I apologize, I
20 can't tell you in feet how far away off site
21 the contamination is.

22 MR. SERENO: But one of the Ohio wells was
23 affected?

24 MR. SMITH: Yes.

25 MR. SERENO: When was that, do you know?

1 you know, a new order for the corrective
2 measures implementation, and by all
3 appearances and all parties needed to go into
4 this, to finally take care of the site and
5 move forward.

6 Once again, the library does have the
7 Statement of Basis, and if you'd like to look
8 at it in a little more detail, it's located in
9 the public library and we do have a few more
10 weeks to provide comments once you look
11 through that and maybe study the situation a
12 little more.

13 MS. ALLEN: My foot went to sleep so I'm
14 not going to stand, I don't want to fall.

15 We're going to open it up to questions
16 now, and after we take a few questions, we're
17 going to take a break and then open up to
18 comments.

19 Now during the comment portion, it's
20 strictly comments. We're not allowed to
21 answer you, that's just the comment portion,
22 but if you want to ask a question during the
23 comment portion, it would be addressed, so
24 we'll open up to questions.

25 Anyone have any questions?

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1 MR. SMITH: I believe pretty early on.
2 Maybe about 1984 when they determined that.

3 MR. BURNS: We did abandon wells early on,
4 but we also have other wells now that we are
5 picking up some contamination, and we believe
6 it to be derived from the Ekco site, but we
7 have no proof of it.

8 MR. SMITH: Would you identify yourself,
9 please?

10 MR. BURNS: Michael Burns, and I'm with
11 Consumers Ohio Water Company. We are the
12 former Ohio Water Company or Ohio Water
13 service. It's our new name now.

14 MR. SERENO: Is there any danger to the
15 customers or anything like that?

16 MR. BURNS: No. We are below MCL levels
17 in all the contaminants that have been found.

18 MS. ALLEN: Any other questions?

19 Your name, sir?

20 MR. SEARS: My name is Dave Sears.

21 I notice that the shadow of the
22 contamination looks like from the map it's
23 going to the Newman Creek area, too.

24 Is it leeching in the creek or am I
25 reading that map incorrectly?

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MR. SMITH: One thing I can tell you is that I have looked at the record -- really I'm quite new at this, but I've looked through the administrative record, and flipping through it, I did see that during the investigation, sediments were sampled in the creek, and, once again, I'll give you my business card and I'll find the answer for you on that, but I know that sediments were tested in the creek to see if there is any impact. I am not sure if the groundwater in that area is discharging up through into the creek or not, but, yes, you certainly made a correct observation that the contamination goes up through to the point where the Newman Creek is.

MR. SEARS: The only question I have to ask too, the type of contamination that's on this site, does that lend itself to bioremediation?

MR. SMITH: Actually it does. Bioremediation is quite a bit different than what we are doing, although it uses some of the same components. When you bioremediate, you certainly put oxygen into the ground as well as nutrients for the natural microbes or

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site or away from the site? Does it flow toward the Tuscarawas River?

MR. SMITH: What we have, it's also found in the Statement of Basis, but I do have three maps here towards the end, and they're labeled figure 3-1, 3-2 and 3-3, and due to the pumping at the facility, the groundwater gradient is reversed backwards.

MR. HARTSOCK: Due to the pumping?

MR. SMITH: Right.

MR. HARTSOCK: So at this point, it's off site heading toward the creek toward the Tuscarawas River?

MR. SMITH: The groundwater?

MR. HARTSOCK: Yes.

MR. SMITH: To our knowledge, and based on the maps by the study, the area that they've indicated here is moving back towards the facility.

MR. SEARS: Is this being pulse pumped right now or continuously pumped?

MR. SMITH: To my knowledge, Ekco is using their two wells, W-1 and W-10, for their process water at the facility, and, again, I'll have to say from what I understand, they

you can could possibly introduce microbes to the ground, and as far as this site's concerned, again, I'm just using my experience in this area, I'm not too sure why they did not decide to do this, other than the fact that you probably wouldn't want to be introducing a lot of those materials when your well is being used for drinking.

MR. SEARS: I was thinking in terms of feeding the microbes that were already on site.

MR. SMITH: Right. Exactly. That's one thing when I was looking through the Statement of Basis I noticed, that bioremediation wasn't even mentioned, but even just introducing the air to the air sparging would, you know, certainly encourage the microbes to do a lot more work on the bioremediation, so it will be a plus. I'm not too sure if it will be a tremendous plus, but it will be there, it will be something that's real.

MR. HARTSOCK: Terry Hartsock.

I was just curious that also looking at the map, is the underground flow in the bedrock or water level, is that toward the

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may alternate between the two wells, so I guess in the sense that would be what the pulse would be, but I am not that familiar with their process at the facility, but they are using W-1 and W-10.

MR. SEARS: Well, this proposal to pulse pump then as part of the long-term corrective action, that would be designed to still maintain the water flow in the same direction? This would be cycled often enough to keep the water flowing?

MR. SMITH: Yes, absolutely. That would definitely be part of the whole remedy is just to make sure that migration ceases, and that in the sense migration comes back just to either stop it altogether or just pull it back towards the facility.

MR. HARTSOCK: You said the water was being used for the process flow.

Is it discharged to the sanitary sewer or hauled off site?

MR. SMITH: I believe it goes to an air stripper that's at the site. That's the impression that I have, because part of the proposed remedies states that the air stripper

1 that's there will continue to be used, and I
2 believe that I've read that to be the
3 processed water.

4 MR. HARTSOCK: That's what they're
5 currently doing right now?

6 MR. SMITH: Right. Definitely. They're
7 doing something about the problem even as we
8 speak.

9 MS. ALLEN: Any other questions?

10 Okay. Any comments?

11 If we don't have any comments, I would
12 like to thank you all for coming, and the
13 meeting is adjourned.

14 - - -

15 (Hearing concluded at 7:50 o'clock, p.m.)

16 - - -

1
2
3
4 C E R T I F I C A T E

5
6 STATE OF OHIO,)
7)SS:
8 SUMMIT COUNTY.)

9 I, Stephanie R. Dean, a Notary Public, certify that
10 I attended the foregoing Hearing in its entirety, and that
11 I wrote the same in stenotype, and that this is a true and
12 correct transcript of my Stenotype notes.

13
14
15
16 Stephanie R. Dean, Notary Public
in and for the State of Ohio.

17 My commission expires August 30, 2000.

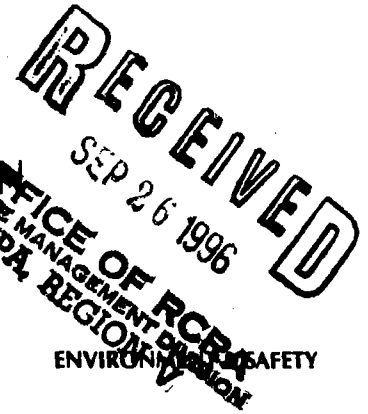
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EH1 - 180



AMERICAN HOME PRODUCTS CORPORATION

FIVE GIRALDA FARMS, MADISON, NEW JERSEY 07940, (201) 660-5000



September 24, 1996

Ms. Cheryl L. Allen
Community Involvement Coordinator
U.S. EPA Region 5
Office of Public Affairs
77 West Jackson Blvd.
Chicago, IL 60604

Mr. R. Smith
U.S. EPA Region 5
77 W. Jackson Blvd.
5-DRE-8J
Chicago, IL 60604

Dear Ms. Allen and Mr. Smith:

Re: EKCO Housewares, Massillon, Ohio

American Home Products Corporation agrees with the selected remedial alternatives as they are outlined in the Draft Statement of Basis (SB) and the final Corrective Measures Study (CMS) for the EKCO Housewares facility in Massillon, Ohio. However, we believe there are some statements in the draft SB that should be revised in order to more accurately represent the findings of the RCRA Facility Investigation (RFI) and the CMS. These issues are briefly discussed below. Figures from the final CMS which support our discussion are also attached.

Page 2, Paragraph 5--*The results of these studies are as follows: ...A nearby municipal well was contaminated.*

Page 5, Paragraph 4--*In September 1987, a groundwater quality assessment for the facility was conducted...sample all on-site wells and the contaminated municipal well (OWS-4)...*

AHPC would like to clarify that the source of the municipal well contamination has never been determined. No data have been collected that indicate any off-site migration of contaminated groundwater is occurring or has occurred. As explained below, the EKCO recovery wells (W-1 and W-10) currently draw water from the deep unit toward the site preventing off-site migration of groundwater. The EKCO facility has used its on-site W wells for production since the 1940s to supply the plant with its water needs. The historical pumpage of these wells would have induced flow conditions similar to current conditions at the site and prevented off-site migration of groundwater.

September 24, 1996

Figure 4 (attached) shows that the extent of the glacial valley from which OWS draws its groundwater extends throughout the industrial Massillon area. It can be seen in this figure that within the glacial valley there are abundant potential sources of VOCs to the groundwater. Industrial facilities located within the glacial valley are much more likely sources of the contamination found at the OWS-4 well than the EKCO facility, which is located west of the glacial valley and has a pumping system that pumps significantly more water than is necessary to prevent off-site contaminant migration.

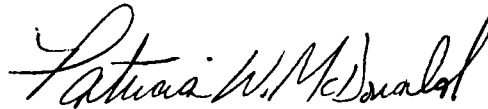
Page 7, Paragraph 3---*On-site recovery wells do not have any effect on the deep sand gravel layer that overlies the bedrock. The flow system in this interval is governed by the OWS wells, which pull the groundwater to the north.*

The attached Figures 1, 2 and 3 from the final CMS show that the EKCO recovery wells (W-1 and W-10) do have an impact on the deep unit east of the facility. These figures show that the EKCO recovery wells induce a significant gradient from the deep unit east of the facility back toward the site. These figures clearly show that the EKCO recovery wells prevent any off-site migration and also pull groundwater from the deep unit toward the site.

Incorporation of these CMS figures and findings into the SB would provide a more accurate and complete representation of the conditions at and around the EKCO Housewares facility.

Thank you for your consideration of these matters. Please contact me at (201) 660-5590 if you have any questions.

Sincerely,

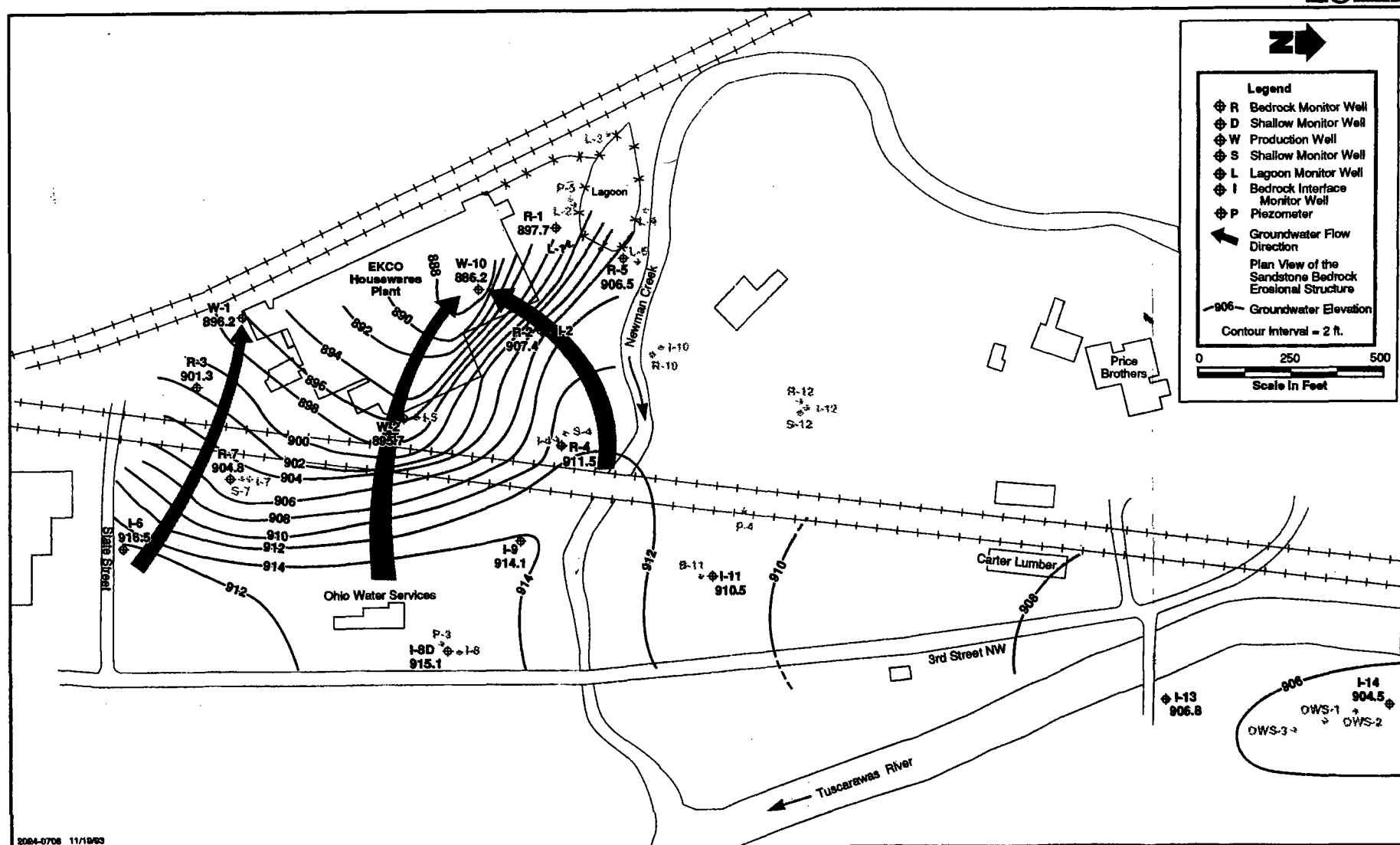


Patricia W. McDonald
Manager
Environmental Affairs

cc: G. Moss, AHPC
L. Bove, Weston

PWM:cc
I:\mcdonald\ekcohsw.ltr
Attachments

WESTON



2084-0708 11/19/93

FIGURE 3 GROUNDWATER CONTOUR MAP OF WELLS COMPLETED IN THE SAND AND GRAVEL WATER BEARING ZONE AND IN THE BEDROCK EKCO FACILITY, MASSILLON, OHIO

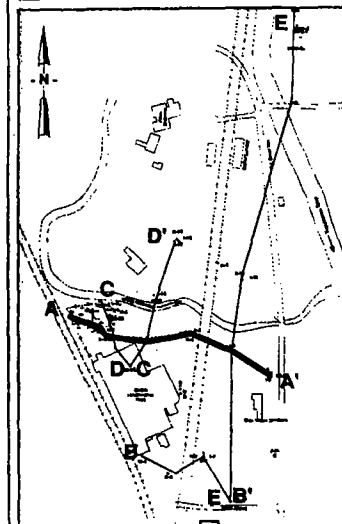
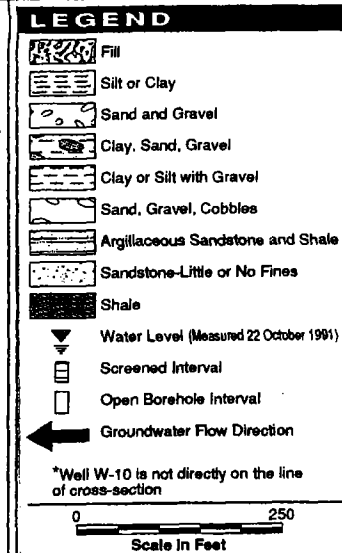
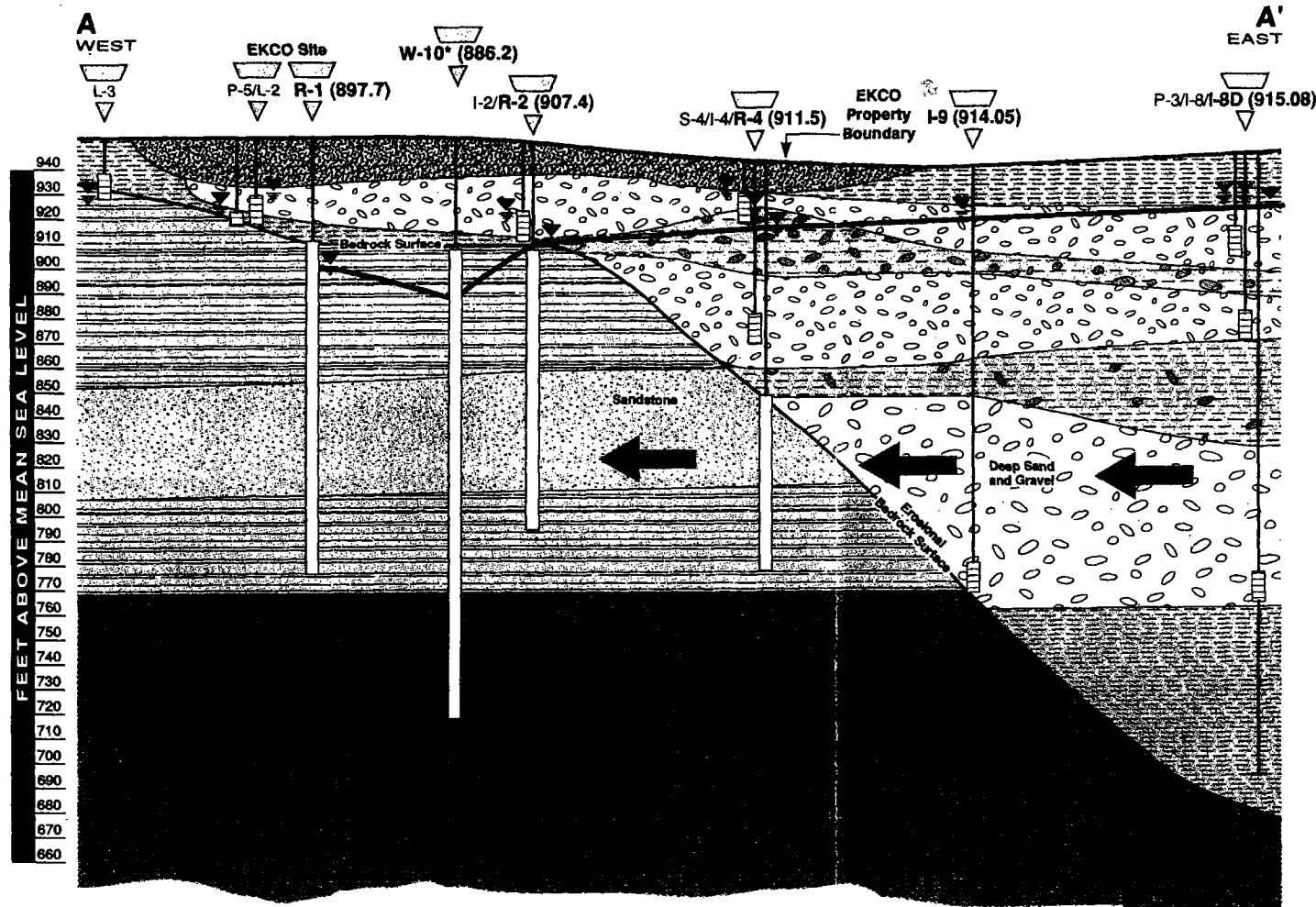
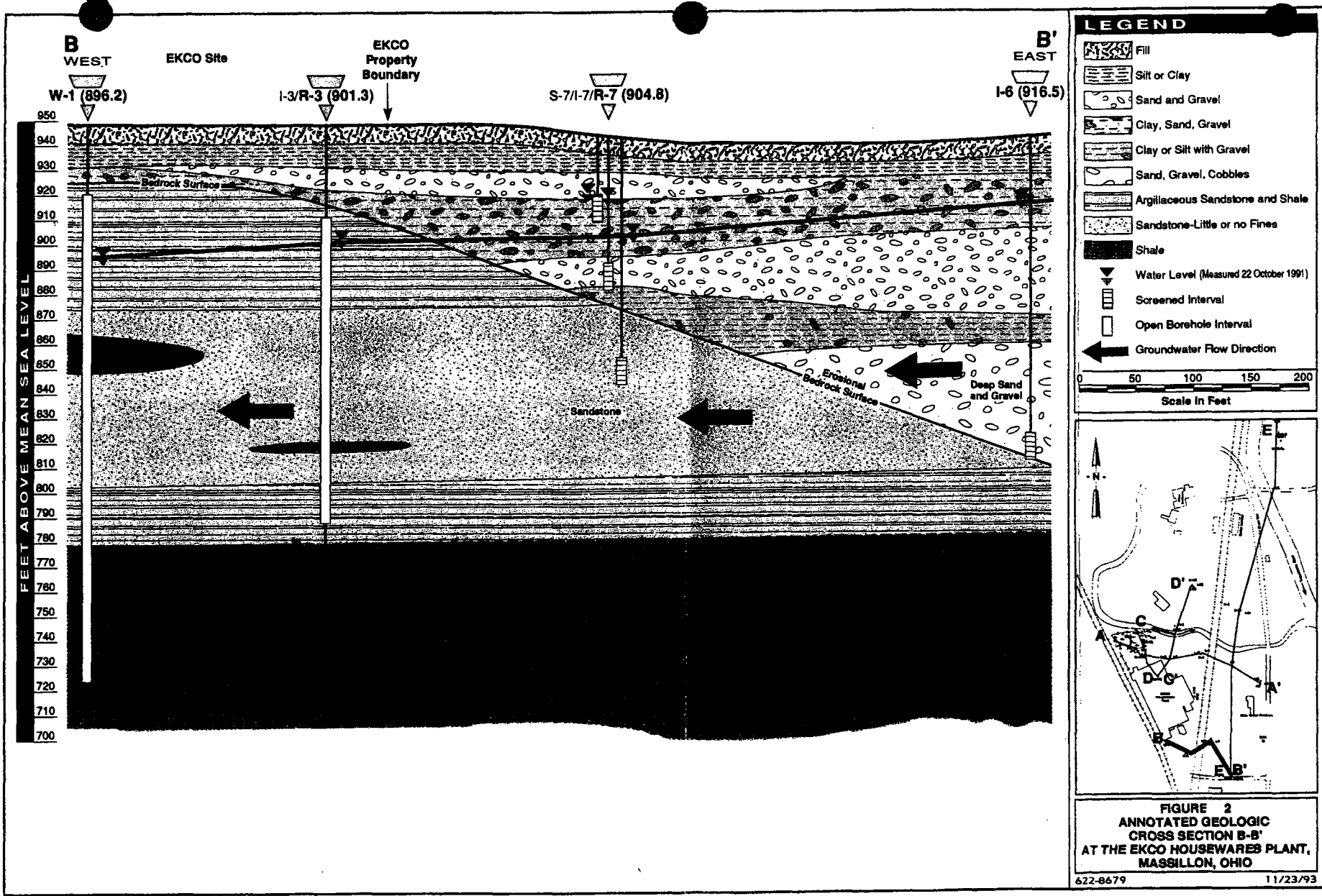


FIGURE 1
ANNOTATED GEOLOGIC
CROSS SECTION A-A'
AT THE EKCO HOUSEWARES PLANT,
MASSILLON, OHIO

622-8678

11/23/93



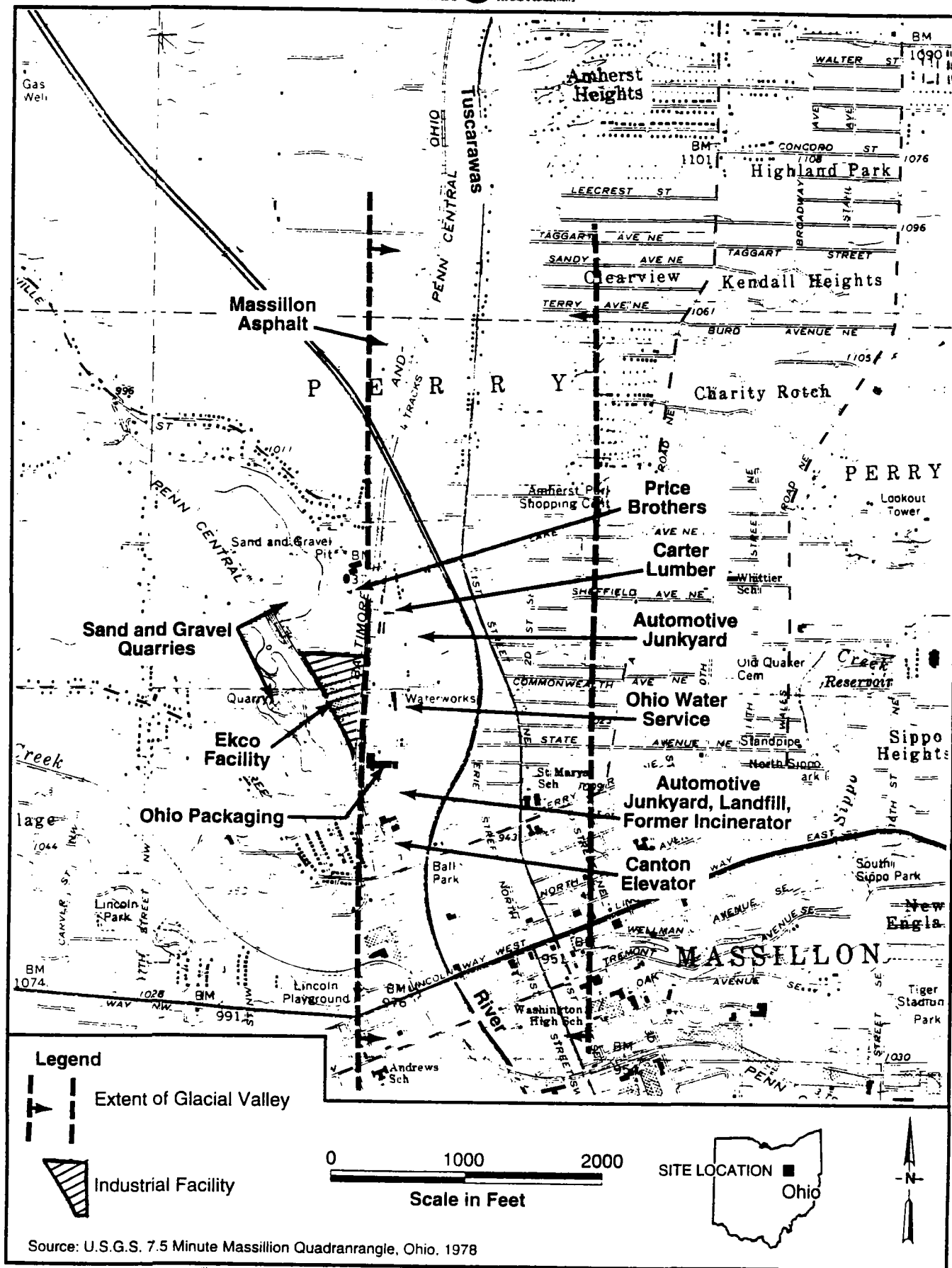


FIGURE 4 EXTENT OF GLACIAL VALLEY

EH1 - 181

CONSUMERS

0 H I O

W A T E R C O M P A N Y

September 21, 1996

Ms. Cheryl Allen
Community Involvement Coordinator
U.S. Environmental Protection Agency
77 West Jackson Blvd.
Chicago, Il 60604

RE: Proposed Statement of Basis
EKCO Housewares
Massillon, Ohio
OHD 045 205 424

Dear Ms. Allen:

Enclosed are the comments, with references, of Consumers Ohio Water Company (COWC) to the Proposed Statement of Basis for EKCO Housewares, Incorporated, Massillon, Ohio.

COWC appreciates the time and effort you and Mr. Smith put forth in visiting Massillon and conducting the public information meeting. COWC also appreciates having the opportunity to comment on the proposed cleanup for contamination at EKCO Housewares, Inc.

Please be informed that COWC is the same company that is referenced in documents prior to 1995 as Ohio Water Service (OWS).

Sincerely,

Michael F. Burns

Stark Regional Division
123 Third Street, S.E.
Post Office Box 584
Massillon, Ohio 44648
Tel (330)833-4156
Fax (330)833-2469

Comments of Consumers Ohio Water Company

to

Proposed Statement of Basis

for

EKCO Housewares, Incorporated, Massillon, Ohio

The Proposed Statement of Basis (SB) for EKCO Housewares, Incorporated, Massillon, Ohio contains the following, " As a result of the pumping, the groundwater in the shallow (Figure 1-8), intermediate (Figure 1-9), and bedrock (Figure I -IO) water-bearing zones under the entire site is flowing directly toward production wells W- I and W-10, and does not appear to flow off-site. Groundwater in the deep sand and gravel water bearing unit flows directly north toward the pumping OWS production wells OWS 1, 2, and 3 (Figure 1-7)."

COWC does not believe this is an accurate portrayal of ground water flow in the area under pumping and non-pumping conditions. COWC believes that natural ground water flow subparallels the flow of the Tuscarawas River under non-pumping conditions (Figure: Model Grid and Static Piezometric Map). COWC also believes pumping conditions are different and ground water flows directly into OWS 1, 2, and 3 from the surrounding area (Figure: 1 and 5 Year Wellhead Protection Areas).

The Corrective Measures Study (CMS) EKCO Housewares, Inc., Massillon, Ohio November 1993, contains the following, "Shallow groundwater sampling results indicate that there is a separate and relatively new TCE source approximately 500 ft north of the EKCO site at Well S-12. The exceptionally high level of TCE and the absence of any appreciable breakdown products indicate that it is a fairly recent TCE release, and it is unrelated to activities that have occurred at the EKCO site. However, the leading edge of the plume originating from EKCO within the bedrock aquifer is located under this point in well R-12."

COWC agrees that contamination is flowing from the EKCO site and contamination at R- 1 2 is attributed to the EKCO spill. COWC can not positively identify the location of the leading edge of the contamination plume. COWC has analyzed wells OWS 1, 2, and 3 on a routine basis since October, 1987 and has detected the following: vinyl chloride (VC), 1, 1, dichloroethane (1, I DCA) and cis 1,2 dichloroethylene (cis 1,2 DCE) (Figure 1).

COWC agrees with the statement that high levels of TCE in S- 1 2 are a separate and unrelated event. Aerial photographs from 1965, on file with the Stark County Engineers, show the presence of an unidentified structure(s) in the general location of wells

S-12 and R-12. The purpose of the structure(s) is not known to COWC and the structure(s) may no longer exist. COWC believes that the purpose of the structure(s) and the activity conducted at the site needs to be investigated.

COWC further believes that the absence of breakdown products may be not entirely dependent upon time but may reflect a geochemical environment that is aerobic. Halogenated aliphatic compounds tend to persist in aerobic environments (Domenico and Schwartz). COWC believes that there are two separate events taking place at R-12, S-12 and that both events are potentially harmful to OWS 1, 2, and 3.

Since the presence of contamination is an established event and the migration of the contamination towards wells OWS 1, 2, and 3 has the potential of affecting our source of drinking water, COWC requests the following:

Dedicated pumps be installed at ten wells; R-12, S-12, 1-13, 1-11, 1-4, R-4, 1-9, 1-8, 1-8D, and OWS-4.

VOC monitoring be conducted at these wells on a quarterly basis and analyzed in an approved lab with COWC's approval.

All analyses be made available to COWC.

Test for Cd, Cr, and Pb in Newman Creek and the above wells. Suspend metal testing if elevated metal levels are not detected. Continue metal testing if elevated levels are detected in any of the wells.

These requests reflect what COWC believes is needed at a minimum to help protect the ground water resources that are the source of drinking water for the 75,000 customers of COWC.

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30 June 2000

Mr. Kenneth Bardo
Project Manager
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

RE: Recovery Wells W-1 and W-10 Mass Removal
Geoprobe Soil Sampling QAPP Addendum
1999 Groundwater Monitoring Report
EKCO Facility, Massillon, Ohio

Dear Mr. Bardo:

Please find enclosed for your review recovery well mass removal calculations, a Geoprobe Soil Sampling Quality Assurance Project Plan (QAPP) Addendum, and the 1999 Groundwater Monitoring Report for the EKCO Housewares, Inc.-World Kitchen (EKCO) Facility in Massillon, Ohio, as Attachments I, II, and III, respectively.

In 1987, EKCO entered into an Administrative Consent Order with the US Environmental Protection Agency (EPA) regarding the Massillon, Ohio, facility. Since that time a RCRA Feasibility Investigation/Corrective Measures Study (RFI/CMS), approved in November 1993, has been completed. A Proposed Statement of Basis (SB), which incorporated the remedial alternatives recommended in the CMS Report, was issued in April 1996 and a public meeting was held in September 1996.

A brief history of the EKCO site is provided below:

- 1965: AHPC purchased EKCO.
- 1984: AHPC sold EKCO.
- 1984: 1,1,1-trichloroethane (TCA) and trichloroethene (TCE) were discovered in the groundwater at the site.
- 1987: An Order of Consent between EKCO and USEPA was finalized.
- February 1986: An air stripper was installed to treat groundwater pumped from wells W-1 and W-10. The treated water is discharged to Newman Creek through a NPDES permit.
- 1988 and 1991: Soil boring programs conducted at the site to characterize soil volatile organic compound (VOC) conditions.
- May 1992: 50 Tons of soil removed due to a 330-gallon 1,1,1-TCA spill.



Mr. Kenneth Bardo
US EPA

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30 June 2000

- November 1993: USEPA approved the Final RFI Report and CMS Reports.
- April 1996: USEPA issued the Proposed SB.
- September 1996: USEPA held a public meeting to present the Proposed SB and accepted comments for 30 days.
- 1999: Borden, Inc. (Borden) purchased EKCO.
- June 2000: Additional focused soil sampling proposed to evaluate current soil VOC concentrations.

As discussed at a 29 February meeting at the facility between AHPC, BORDEN, Roy F. Weston, Inc., EKCO, USEPA, and Ohio EPA, the additional soil sampling is proposed to assess current soil VOC concentrations in soil. If the new data show that concentrations have decreased (due to natural attenuation) in the 9 to 12 years that have elapsed since the original samples were collected, the soil remediation alternative recommended in the Proposed SB may no longer be appropriate and may need to be revised. Depending on the sampling results, this could include the reduction and/or elimination of proposed soil remediation areas. The proposed soil sampling should complete the data needed to finalize the SB, at which time a new Consent Order should be drafted.

The Proposed SB explains the remedial alternatives recommended for cleaning up the contaminated soil and groundwater at the facility, and the issuance of the SB is part of the RCRA public participation process. The SB essentially presents a synopsis of the findings and recommendations presented in the finalized RFI and CMS reports and is a mechanism through which the public is informed of site conditions and encouraged to provide comment on the planned remedial alternatives. Once the SB is finalized, the Corrective Measures Implementation (CMI), which is the final phase of the RCRA Corrective Action Process, can begin.

The main component of the groundwater remedial alternative recommended in the CMS and the Proposed SB is a groundwater pump and treat program utilizing the onsite production wells W-1 and W-10. EKO has been operating a pump and treat system at the facility since 1986. Production wells W-1, W-10, and an additional production well W-2 have reportedly been pumped to provide process water for the facility since production activities began at the plant in the 1940s. These groundwater extraction activities have induced a drawdown cone beneath the plant since the plant was put into operation, and the air stripper system has provided treatment of contaminated groundwater since it was installed in 1986. The mass removal calculations included as Attachment I demonstrate that this system has been very effective in removing a significant amount of contaminant mass. The only remedial activities recommended in the Proposed SB which are not currently underway are the evaluation of pulsing extraction wells W-1 and W-10, and a soil vapor extraction (SVE)/air sparging system.



Mr. Kenneth Bardo
US EPA

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30 June 2000

As discussed above, we believe that completion of the additional soil sampling outlined in the enclosed attachment and reevaluation of the proposed SVE system in light of the sampling data would be prudent prior to finalization of the SB.

Please call either Tom Cornuet at (610) 701-7360 or Larry Bove at (610) 701-3020 with any questions or comments.

Very truly yours,

ROY F. WESTON, INC.

Lawrence J. Bove, P.E.
Program Manager

Tom Cornuet, P.G.
Project Manager

cc: M. Basso, AHP (w/o Attachment 3)

ATTACHMENT I

**RECOVERY WELL W-1 AND W-10
MASS REMOVAL CALCULATIONS**

Recovery Well W-1 and W-10 - Mass Removal Calculations

EKCO has derived its water supply from wells W-1, W-2, and W-10 virtually from the inception of operations at the facility. Well records indicate that wells W-1 and W-2 were installed in 1951 and 1953, respectively, and well W-10 was reportedly installed sometime prior to 1943. Well W-2 was previously used for groundwater production at the facility but was permanently taken out of service (prior to 1985). Wells W-1 and W-10 are being used as both recovery wells and as production wells for use in manufacturing processes at the facility. A packed column air stripper was installed in 1986. Groundwater from production wells W-1 and W-10 is treated in the on-site air stripper, then either routed to various plant processes or discharged to Newman Creek via an underground storm sewer.

The groundwater remediation system currently in operation at the EKCO facility consists of two bedrock wells, W-1 and W-10, pumping at a combined rate of approximately 400 to 600 gpm. The water is then pumped through the on-site air stripper system to remove VOCs. The recovery well pumping rates, total VOCs detected, and pounds of VOCs removed are shown in Table 1. The cumulative VOCs removed and the total VOCs removed per month between March 1986 and December 1999 are graphed on Figures 1 and 2, respectively. Figure 1 shows that a total of approximately 40,000 pounds of VOCs were removed as of December 1999. The graph on Figure 2 is a polynomial trend line of the monthly Total VOCs removed (lb/month) shown on Table 1 and shows that the total pounds of VOCs removed each month have varied due to variations in concentrations, pumping rates, and sampling dates. The combined mass of VOCs removed has decreased from an average of approximately 500 pounds per month when the sampling started in 1986 to an average of approximately 100 pounds per month during 1999.



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TO: Ken Barolo

Recipient's Telecopy
Telephone # _____

FROM: Tom Cornuet

Originator's Telephone # _____

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W.O. #: _____

DATE: 8/14/00

COMMENTS:

Ken, Mass Removal info.
Thanks

Tom

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Table 1
Recovery Wells W-1 and W-10
Pumping Rates, Total VOCs Detected, and Pounds Removed

Sample Date	Recovery Well W-1				Recovery Well W-10			
	Pumping Rate (gpm)	Water Treated (gallons)	Total VOCs (µg/L)	Total VOCs Removed (lbs/month)	Pumping Rate (gpm)	Water Treated (gallons)	Total VOCs (µg/L)	Total VOCs Removed (lbs/month)
3/10/86	240	2,315,000	1,524	29	140	1,399,700	13,800	161
4/1/86	240	2,381,000	1,175	23	140	1,431,500	14,100	168
5/1/86	240	10,855,000	1,340	121	140	6,399,100	12,000	640
6/3/86	240	11,163,000	756	70	140	6,332,000	10,800	570
7/10/86	240	12,976,000	962	104	134	7,155,700	10,400	620
8/4/86	280	7,963,000	530	35	125	4,103,400	7,800	267
9/2/86	220	1,324,000	893	10	140	5,316,400	12,100	536
10/1/86	220	8,300,000	688	48	130	5,240,400	11,843	517
11/6/86	220	8,595,000	785	56	140	6,461,100	16,470	887
12/1/86	240	6,043,000	817	41	132	3,738,000	13,370	417
1/13/87	220	14,297,000	673	80	128	7,991,500	12,200	813
2/2/87	230	5,260,000	680	30	125	2,946,600	11,118	273
3/2/87 **	0	0	0	0	0	0	0	0
4/2/87	220	9,897,000	571	47	120	5,079,700	10,376	439
5/1/87	230	9,571,000	497	40	120	5,115,400	7,308	312
6/2/87	230	10,315,000	614	53	120	5,362,100	8,055	360
7/6/87	225	11,294,000	458	43	130	5,859,700	6,808	333
8/4/87	220	9,570,000	493	39	120	4,991,400	7,626	317
9/1/87	270	10,411,000	466	40	110	4,583,700	9,728	372
10/1/87	270	12,415,000	474	49	120	4,563,600	12,072	459
11/4/87	270	11,642,000	557	54	100	4,524,000	10,106	381
12/3/87	260	5,261,000	425	19	114	4,275,500	7,700	274
1/5/88	270	10,306,000	458	39	150	2,330,400	6,604	128
2/3/88	260	10,763,000	346	31	150	3,124,700	7,103	185
3/1/88	260	10,257,000	330	28	150	4,899,100	7,706	315
4/5/88	260	13,206,000	389	43	255	7,478,000	5,604	349
5/2/88	270	10,172,000	341	29	305	10,320,100	11,445	985
6/1/88	270	4,246,000	218	8	305	13,678,800	22,704	2,589
7/27/88	270	79,000	190	0	305	16,765,000	4,080	570
8/1/88	245	6,610,000	159	9	330	10,901,100	3,875	352
9/1/88 *	245	4,586,400	0	0	375	15,822,800	3,262	430
10/3/88	220	4,723,000	129	5	340	16,297,200	3,905	531
11/3/88	170	8,298,000	58	4	340	13,434,100	1,889	212
12/1/88	170	7,115,000	123	7	340	15,039,297	2,447	307
1/4/89 *	0	9,545,000	0	0	385	13,722,800	2,355	269
2/1/89	240	7,603,200	101	6	330	13,897,500	2,233	259
3/1/89	230	9,191,000	117	9	335	13,260,900	3,041	336
4/3/89	230	10,102,600	85	7	345	16,085,300	3,053	409
5/1/89	240	9,500,000	127	10	355	14,350,799	3,028	362
6/1/89	245	10,630,000	117	10	350	16,032,300	2,370	317
7/24/89	250	12,477,000	94	10	360	18,161,100	1,915	290
8/2/89	260	9,999,000	87	7	367	14,286,300	2,369	282
9/5/89	240	12,224,000	115	12	385	18,124,200	1,824	276
10/3/89	250	10,012,000	120	10	370	14,808,400	2,051	253
11/1/89	250	10,402,000	127	11	360	15,362,900	2,144	275
12/4/89	245	11,784,000	134	13	370	17,443,000	2,229	324

Table 1
Recovery Wells W-1 and W-10
Pumping Rates, Total VOCs Detected, and Pounds Removed

Sample Date	Recovery Well W-1				Recovery Well W-10			
	Pumping Rate (gpm)	Water Treated (gallons)	Total VOCs (µg/L)	Total VOCs Removed (lbs/month)	Pumping Rate (gpm)	Water Treated (gallons)	Total VOCs (µg/L)	Total VOCs Removed (lbs/month)
1/5/90	250	11,236,000	129	12	360	16,636,299	2,348	326
2/1/90	250	9,595,000	142	11	360	13,996,200	1,923	224
3/5/90	260	11,648,000	117	11	360	16,368,200	2,173	297
4/3/90	260	10,847,000	109	10	350	14,577,000	1,832	223
5/2/90	260	10,799,000	131	12	340	14,133,099	2,849	336
6/4/90	255	12,310,000	146	15	330	16,000,700	2,597	346
7/6/90	265	11,946,000	173	17	330	15,051,200	2,540	319
8/3/90	260	10,541,000	173	15	320	13,180,600	2,378	261
9/5/90	260	12,319,000	158	16	325	13,845,800	2,140	247
10/2/90	260	10,020,000	150	13	340	12,895,300	2,163	233
11/1/90	260	11,106,000	132	12	350	14,958,000	2,776	346
12/4/90	260	12,120,000	150	15	340	16,588,600	3,069	424
1/7/91	260	12,470,000	180	19	335	16,720,500	2,850	397
2/1/91	260	9,342,000	173	13	340	12,085,300	2,153	217
3/8/91	255	12,871,000	179	19	335	16,758,399	2,286	319
4/1/91	250	8,634,000	175	13	325	11,265,200	1,873	176
5/1/91	210	9,789,000	181	15	320	13,868,800	1,610	186
6/4/91	210	10,055,000	264	22	310	15,440,399	2,384	307
7/1/91	205	3,211,920	303	8	260	4,938,500	2,436	100
8/1/91	200	9,156,000	248	19	265	11,861,000	1,965	194
9/3/91	210	9,767,000	302	25	270	12,835,400	2,182	233
10/3/91	200	8,452,000	233	16	280	11,722,800	1,876	183
11/5/91	205	9,507,000	208	16	265	12,592,500	1,498	157
12/13/91	205	10,847,000	256	23	265	14,287,000	1,554	185
1/6/92 *	280	2,882,000	0	0	280	9,372,000	1,594	125
2/7/92 *	0	0	0	0	285	12,845,900	1,744	187
3/6/92	205	5,313,000	4,726	209	270	4,729,100	3,928	155
4/13/92	220	12,038,400	138	14	240	10,656,900	827	73
5/5/92	220	6,857,000	174	10	235	7,570,000	1,418	89
6/2/92	210	8,584,000	218	16	265	10,566,300	1,206	106
7/1/92	220	8,757,000	71	5	270	10,848,400	1,470	133
8/4/92	230	10,365,000	165	14	275	13,297,500	1,538	171
9/2/92	220	9,155,000	169	13	280	11,747,000	1,830	179
10/3/92	230	9,566,000	177	14	295	12,405,700	1,226	127
11/3/92	230	10,296,000	148	13	305	13,744,400	1,489	171
12/8/92	230	11,646,000	175	17	300	15,364,800	1,298	166
1/6/93	230	10,086,000	135	11	310	13,320,800	666	74
2/3/93	245	9,073,000	183	14	315	11,889,900	2,162	214
3/2/93	230	9,065,000	135	10	300	11,764,300	1,420	139
4/1/93	230	8,373,000	162	11	310	12,000,900	1,954	196
5/3/93	235	10,938,000	136	12	305	14,383,000	1,673	201
6/1/93	230	9,408,000	0	0	310	12,023,000	1,592	160
7/1/93	230	9,408,000	124	10	300	12,493,900	1,660	173
8/9/93	210	11,727,000	132	13	305	16,701,000	1,546	215
9/2/93	190	6,655,000	140	8	300	10,205,000	1,660	141
10/1/93	175	7,505,000	136	9	289	12,194,500	1,486	151

Table 1
Recovery Wells W-1 and W-10
Pumping Rates, Total VOCs Detected, and Pounds Removed

Sample Date	Recovery Well W-1				Recovery Well W-10			
	Pumping Rate (gpm)	Water Treated (gallons)	Total VOCs (µg/L)	Total VOCs Removed (lbs/month)	Pumping Rate (gpm)	Water Treated (gallons)	Total VOCs (µg/L)	Total VOCs Removed (lbs/month)
11/3/93 *	200	7,000,000	0	0	294	11,044,200	1,422	131
12/1/93 *	0	0	0	0	300	12,173,200	1,263	128
1/13/94	300	19,000,000	136	22	290	18,560,500	1,534	237
2/14/94	145	9,612,000	138	11	295	13,229,800	1,779	196
3/3/94	245	10,584,000	144	13	295	7,058,400	1,860	109
4/19/94	245	14,102,000	141	17	290	11,995,200	2,040	204
5/5/94	245	5,644,800	144	7	290	6,604,100	1,788	98
6/3/94 *	245	9,878,000	158	13	0	0	0	0
7/11/94	280	15,590,000	187	24	300	17,280,000	1,801	259
8/9/94	245	9,172,800	129	10	235	8,798,400	1,694	124
9/28/94 *	230	15,906,000	167	22	0	0	0	0
10/17/94	230	6,624,000	170	9	315	9,072,000	2,282	173
11/4/94	230	5,961,600	152	8	315	8,164,800	1,374	94
12/13/94	270	13,223,000	136	15	320	18,011,300	958	144
1/5/95	240	7,919,000	166	11	320	10,615,900	1,163	103
2/3/95	240	10,022,400	170	14	320	13,363,200	1,082	121
3/13/95	230	13,923,000	186	22	350	18,630,700	1,016	158
4/5/95	220	5,254,000	114	5	355	8,046,800	1,088	73
5/8/95	220	10,493,000	108	9	365	16,519,000	1,287	177
6/7/95	220	8,940,000	80	6	365	15,674,400	909	119
7/12/95 *	270	12,200,000	217	22	0	0	0	0
8/16/95	220	11,003,000	56	5	350	17,136,000	1,179	168
9/26/95 *	200	15,110,000	246	31	0	0	0	0
10/25/95	220	10,001,000	260	22	330	8,276,700	2,548	176
11/7/95	220	400,900	167	1	340	6,739,200	813	46
12/7/95	215	9,349,000	122	10	345	16,056,000	942	126
1/26/96	220	11,884,000	114	11	340	19,096,400	1,263	201
2/29/96	230	4,069,000	120	4	360	7,241,800	762	46
3/15/96	230	11,505,000	77	7	360	18,152,000	1,070	162
4/12/96	230	4,200,000	89	3	370	14,820,700	951	118
5/7/96	230	8,076,000	74	5	375	13,299,100	791	88
6/7/96 *	0	0	0	0	405	16,989,700	978	139
7/29/96 *	0	0	0	0	395	29,864,900	803	200
8/15/96	230	14,940,000	83	10	355	8,798,200	663	49
9/13/96	230	9,630,000	103	8	345	14,661,300	1,274	156
10/10/96	230	9,027,000	129	10	350	13,525,100	1,243	140
11/13/96	230	11,384,000	129	12	325	17,167,400	1,081	155
12/10/96	230	8,945,000	118	9	350	13,653,400	1,191	136
1/10/97	230	10,392,000	154	13	350	15,748,700	1,166	153
2/28/97	230	14,864,000	91	11	330	24,466,100	1,297	265
3/19/97	220	5,675,000	236	11	360	9,114,000	2,296	174
4/3/97	220	5,106,990	215	9	325	8,003,300	2,940	196
5/13/97	220	12,481,000	101	11	360	20,426,200	922	157
6/13/97	215	9,636,000	231	19	350	15,873,700	1,474	195
7/10/97	215	8,234,000	75	5	340	13,564,600	701	79
8/6/97	210	8,161,000	92	6	335	13,063,700	992	108

Table 1
Recovery Wells W-1 and W-10
Pumping Rates, Total VOCs Detected, and Pounds Removed

Sample Date	Recovery Well W-1				Recovery Well W-10			
	Pumping Rate (gpm)	Water Treated (gallons)	Total VOCs (µg/L)	Total VOCs Removed (lbs/month)	Pumping Rate (gpm)	Water Treated (gallons)	Total VOCs (µg/L)	Total VOCs Removed (lbs/month)
9/12/97	210	7,999,000	611	41	0	0	0	0
10/8/97	210	7,854,000	314	21	340	15,853,000	763	101
11/20/97	210	13,032,000	108	12	340	21,052,000	913	160
12/16/97	210	7,688,000	105	7	300	1,836,800	946	14
1/29/98	220	13,429,000	115	13	0	0	0	0
2/12/98	225	4,232,000	94	3	280	12,992,500	1,268	137
3/19/98	215	10,453,000	142	12	0	0	0	0
4/29/98	215	12,598,000	207	22	0	0	0	0
5/21/98	205	6,525,000	164	9	0	0	0	0
6/25/98 *	0	0	0	0	350	17,281,800	877	126
7/23/98 *	0	0	0	0	285	10,452,700	968	84
8/27/98 *	0	0	0	0	280	10,023,300	1,118	93
9/22/98 *	0	0	0	0	295	6,459,500	1,179	63
10/27/98	210	8,628,000	91	7	260	12,962,200	1,092	118
11/30/98 *	0	0	0	0	295	13,446,000	936	105
12/17/98	200	5,274,000	99	4	275	6,954,200	1,012	59
1/28/99	200	12,230,000	107	11	280	16,674,300	1,035	144
2/25/99	200	8,062,000	112	8	285	11,197,200	1,399	131
3/25/99	200	8,038,000	57	4	285	11,527,600	1,417	136
4/28/99	200	9,504,000	82	6	305	14,510,100	992	120
5/27/99	200	8,352,000	87	6	260	10,948,600	1,003	92
6/30/99	195	9,266,400	85	7	260	11,876,000	1,082	107
7/28/99	195	7,862,400	89	6	265	10,660,900	1,080	96
8/26/99 *	0	0	0	0	275	8,346,100	1,205	84
9/30/99 *	0	0	0	0	250	10,818,100	752	68
10/28/99	190	7,660,800	86	5	240	9,370,300	759	59
11/23/99	195	7,300,800	93	6	240	8,847,500	761	56
12/14/99	195	4,773,600	110	4	240	4,804,000	140	6

* One of the wells was not pumping at sample collection time.

**Laboratory data package was not available.

Figure 1
Recovery Wells W-1 and W-10
Cumulative VOCS Removed (pounds)

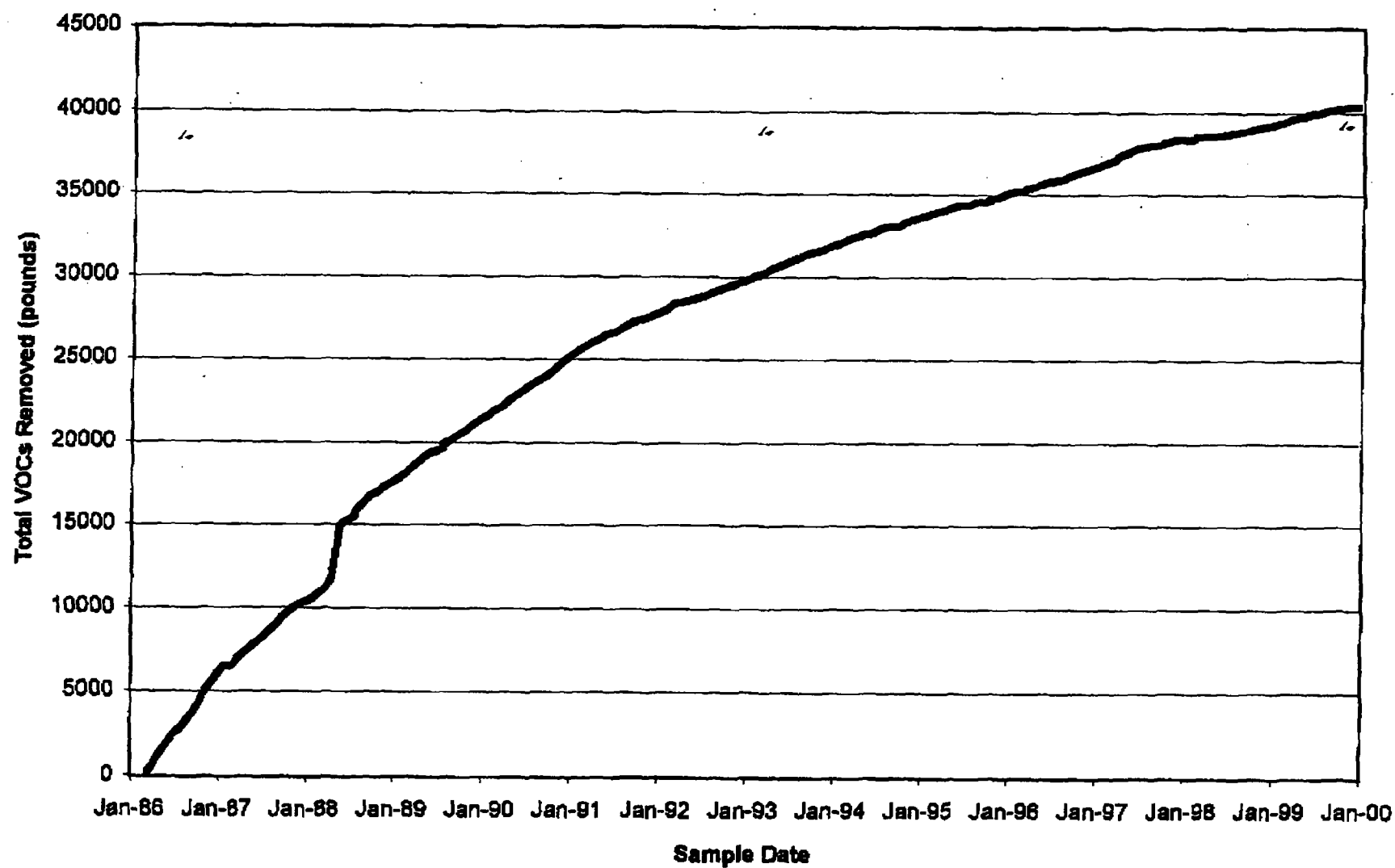
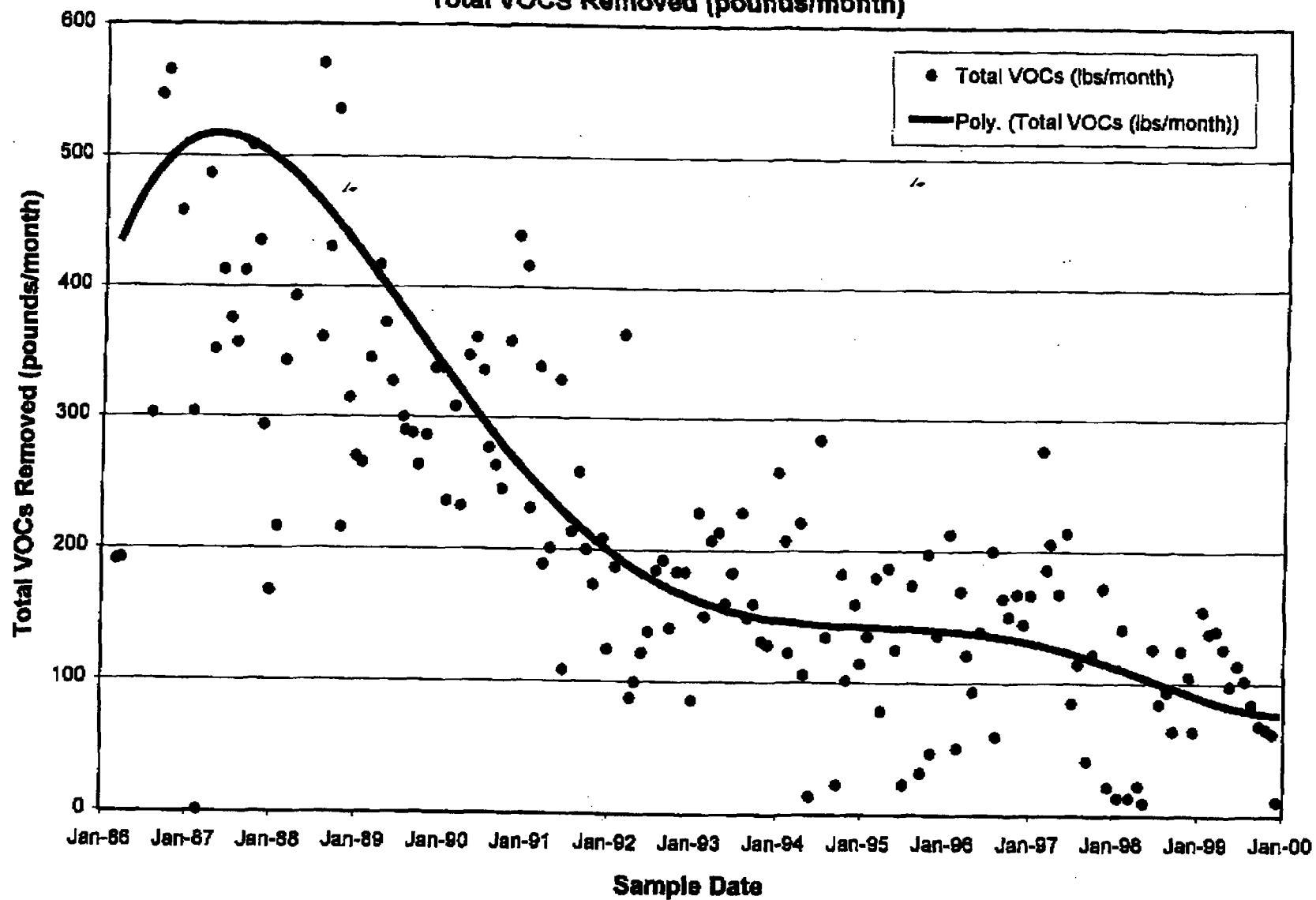


Figure 2
Recovery Wells W-1 and W-10
Total VOCs Removed (pounds/month)





ATTACHMENT II

**GEOPROBE SOIL SAMPLING
QAPP ADDENDUM**



**Geoprobe™ Sampling Quality Assurance
Project Plan (QAPP) Addendum**

for the

Quality Assurance Management Plan (September 1988)

for the

**EKCO Housewares, Inc. Facility in
Massillon, Ohio
U.S. EPA ID #OHD 045 205 424**

Prepared by

**Roy F. Weston, Inc.
1400 Weston Way
West Chester PA 19380**

June 2000

W.O. No. 02994.002.006

Prepared for

**American Home Products Corporation
One Campus Drive
Parsippany, NJ 07054**



**QAPP ADDENDUM ELEMENT 1
TITLE/SIGNATURE PAGE**

**GEOPROBETTMSAMPLING QUALITY ASSURANCE
PROJECT PLAN (QAPP) ADDENDUM
for the
QUALITY ASSURANCE MANAGEMENT PLAN (SEPTEMBER 1988)
for the
EKCO HOUSEWARES, INC. FACILITY IN
MASSILLON, OHIO
U.S. EPA ID NUMBER OHD 045 205 424**

JUNE 2000

**Prepared by:
ROY F. WESTON, INC.
1400 Weston Way
West Chester, PA 19380
W.O. No. 02994.002.006**

**Prepared for:
American Home Products Corporation
One Campus Drive
Parsippany, NJ 07054**

Matthew Basso – AHPC Project Manager	Date
Thomas Cornuet – WESTON Project Manager	Date
Laurence Bove – WESTON Program Manager/QA Officer	Date
Ben Barker – B.L. Analytical QA Manager	Date
Victoria White – AquaTech Laboratories QA Manager	Date
Kenneth Bardo – U.S. EPA RCRA Project Manager	Date
– U.S. EPA RCRA Enforcement/Permitting QA Coordinator	Date

QAPP ADDENDUM ELEMENT 6 SAMPLING PROCEDURES

The sampling procedures to be used in this focused site investigation are limited to Geoprobe® soil boring sample collection at selected areas discussed herein. The Geoprobe soil boring sampling scope of work and sample collection procedures are described below.

Geoprobe Soil Sampling Scope of Work

This scope of work is in response to discussions with AHPC regarding additional soil sampling and other site-related activities at a meeting on 29 February 2000 with AHPC, WESTON, the US EPA, Ohio EPA, EKCO, and BORDEN. The purpose of this sampling effort is to assess current source area soil conditions in order to evaluate soil remedial approaches and associated cost estimates. It is anticipated that data from this study will help to target the soil remediation system currently proposed in the Draft Statement of Basis (SB) issued in September 1996.

Based on the February meeting with the AHPC and EKCO project teams, it was determined that additional soil boring sampling of potential remediation areas was necessary to both confirm and delineate the targeted areas. These additional data will be used to better delineate the horizontal and vertical extent of soil impacted by trichloroethene (TCE) and 1,2-dichloroethene (DCE) concentrations in areas that initially exceeded site cleanup goals based on samples collected in 1988 and 1991 during the RCRA Feasibility Investigation (RFI). The previous RFI TCE and DCE soil sampling results are attached (RFI Figures 2-1 and 2-4). The new data generated by the Geoprobe sampling will also be used to evaluate whether VOC concentrations have decreased in the 9 to 12 years that have elapsed since the original soil samples were collected. There are four areas proposed for soil vapor extraction (SVE) remediation in the Draft SB. Two areas are located at the western edge of the property at SB-06 (1991), SB-13 (1988), and SB-011 (1988), and two areas are located at the northern end of the production building at SB-07 (1988) and SB-11 (1991). All four of these areas are currently delineated by only one or two borings at each location. The additional data will assist in delineating the areas targeted for SVE remediation and determining if soil remediation is still required. This will assist in providing the project team with an understanding of degradation at the site.

It is currently anticipated that approximately 12 additional soil borings will be needed to supplement the existing data. The proposed locations for the new soil borings are shown in Figure 1. If these initial 12 borings encounter TCE and DCE concentrations above the site cleanup goals (1 and 10 mg/kg, respectively) additional borings may be required to complete the delineation. The borings will be completed using a Geoprobe rig to the top of bedrock refusal, which varies in depth from approximately 6 to 16 feet below ground surface (bgs) in the target areas. Approximately two to four soil samples will be collected from each boring for analysis of VOCs. This addendum to the original Quality Assurance Management Plan is provided to

address the sample collection procedures and analytical methods used for this effort. A new Quality Assurance Project Plan (QAPP) will be prepared and submitted for EPA review and approval prior to implementing the Final SB remedial activities.

Prior to mobilizing to the field, a preliminary 3-dimensional (3D) model will be developed using the historical soil VOC data. The 3D model will be developed using earthVision[®] software, which is a specialized geologic and environmental modeling tool used in the environmental and oil and gas industries. The field screening results from the soil samples collected on the first day will be used to determine if any of the remaining sample locations should be revised to better delineate the horizontal and vertical extent of the VOC constituents that exceed the site cleanup goals. It is anticipated that the total Geoprobe effort will require approximately 3 to 4 days in the field, including mobilization and demobilization. A final soil sampling report will be provided which includes photographs taken of the soil boring locations, soil classification logs, laboratory data reports, and TCE and DCE concentration maps. In addition, we will have developed a geologic and contaminant profile that can be used to determine soil volumes for the areas requiring remediation.

As requested by the U.S. EPA at the February meeting, the samples will be collected and analyzed using the U.S. EPA Method 5035. If feasible, the samples will be analyzed using a mobile laboratory. In the event Method 5035 cannot be conducted using a mobile laboratory, a full-service laboratory will be used for the analysis. If necessary, samples sent to a full-service laboratory will be analyzed on an expedited basis.

Geoprobe Soil Sampling Procedures

The Geoprobe sampling procedure is described below.

- Prior to conducting any site activities the project field team will review and agree to follow the site HASP.
- Prior to any intrusive subsurface sampling, the soil boring sampling locations will be marked and the locations will be cleared for utilities by the EKCO site contact, Jeff Burman.
- Each soil sampling location will be photographed prior to drilling activities commence.
- Each soil sampling location will be located either by GPS or measurements from known fixtures such as buildings or monitor wells.
- Soil samples will be collected using a Geoprobe direct-push sampling device. The Geoprobe will be used to push (or hammer) acetate-lined, low carbon steel sample tubes into the subsurface to bedrock refusal, which occurs at a depth of approximately 6 to 16 ft bgs.

- After retrieval of the sample tubes, the acetate liners will be cut open and the sample will be immediately scanned with a Thermal Vapor Analyzer (TVA) as a preliminary assessment of organic compounds in the soil.
- Approximately two to four samples will be collected from each soil boring location for analysis of a six VOCs (TCE, 1,2-DCE, 1,1-DCE, PCE, 1,1,1-TCA, and vinyl chloride). The samples for VOC analysis will be collected from intervals that appear the most likely to be contaminated based on the TVA screening and other observations such as staining.
- The VOC soil samples will be collected and analyzed following US EPA SW-846 method 5035. After collection, the samples will be either transferred to an onsite laboratory (BL Analytical) or shipped to a fixed laboratory (Aquatech Laboratories) for analysis of the six target VOC compounds.
- The following sample identification code will be used:
 - SB-01-2.7-00,
 - where the first two digit number is the boring number beginning at 01,
 - the second two digit number is the depth below ground surface in feet,
 - and the third two digit number represents the sample year (i.e. 00 for year 2000).
- Each VOC sample will be labeled with the following information:
 - Sample identification code
 - Collection date and time
 - Analysis (select VOCs)
- After selected samples are collected for VOC analysis, a description of the entire soil sample interval will be performed. This description will include the following information:
 - TVA screening results
 - Sample identification codes for VOC samples collected
 - Lithologic description

**QAPP ADDENDUM
ELEMENT 9
ANALYTICAL PROCEDURES**

Soil samples collected during field sampling activities for the EKCO investigation will be analyzed by BL Analytical LLC, 2407 Park Drive, Harrisburg, PA 17110, (717)651-9850 and/or Aqua Tech Environmental Laboratories, 1776 Marion-Waldo Rd. Marion, OH 43301, (740)389-5991.

The laboratories named above will implement the project required SOPs. These laboratory SOPs for sample preparation and analysis are based on SW-846 3rd Edition Final Update III, Revised May 1997. These SOPs provide sufficient details and are specific to this investigation.

Table 1 summarizes the analyte group of interest and the appropriate U.S. EPA reference method for the organic analytes to be evaluated in this investigation.

Table 1

Analyte Group	Matrix	Preparation Method	Analysis Method
<u>Short List VOCs</u>	Soil	SW5035	SW8260B

Tables 2 shows the reporting levels for the seven chlorinated hydrocarbon analytes of interest.

Table 2

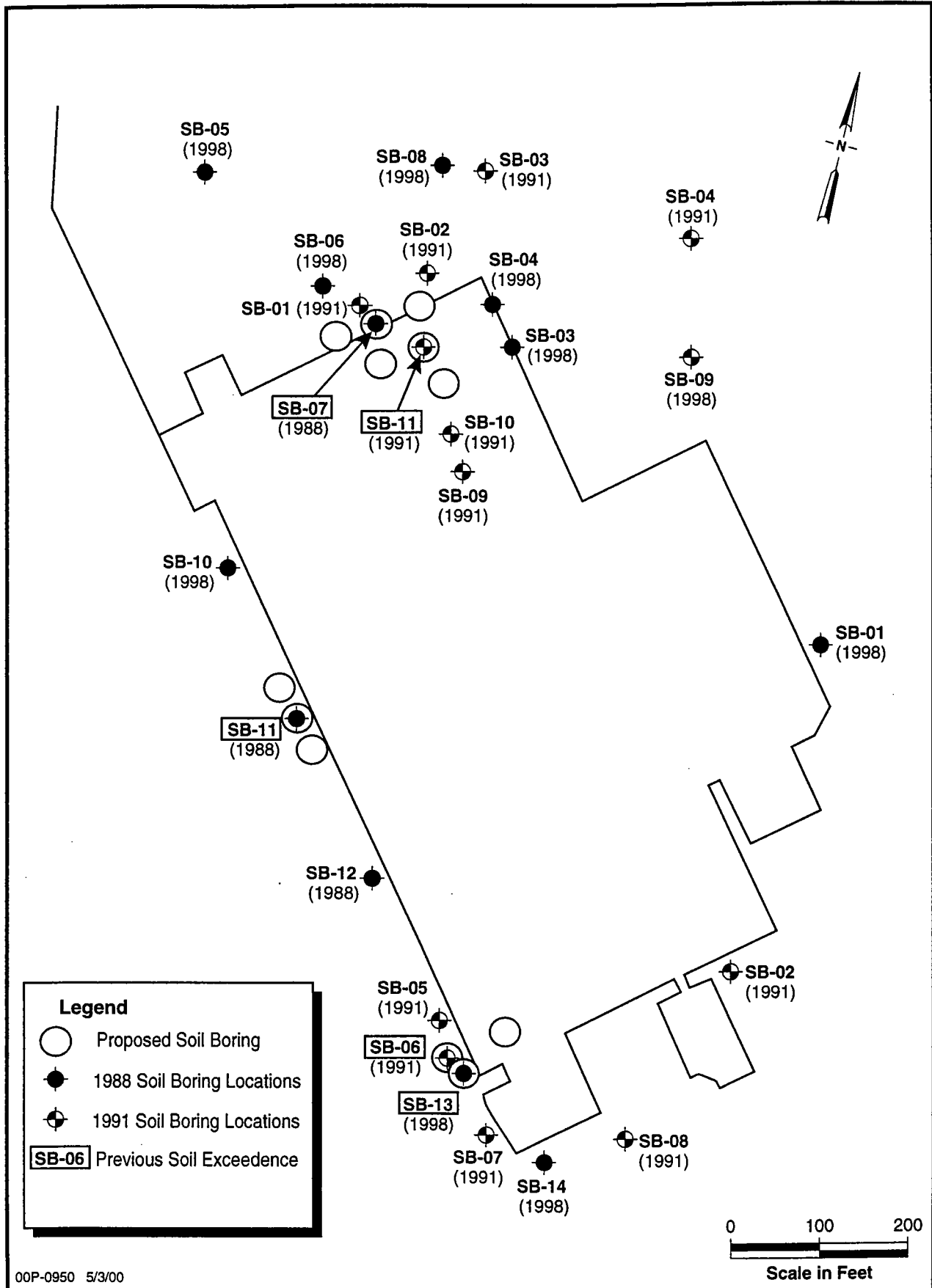
VOC Analyte	CAS No.	Reporting Limit (µg/kg)
1,1,1-Trichloroethane	71-55-6	10.0
1,1-Dichloroethene	75-35-4	10.0
cis-1,2-Dichloroethene	156-59-2	10.0
trans-1,2-Dichloroethene	156-60-5	10.0
Tetrachloroethene (PCE)	127-18-4	10.0
Trichloroethene (TCE)	79-01-6	10.0
Vinyl Chloride	75-01-4	10.0

Table 3 below includes a QC section that addresses the minimum QC requirements for the analysis of VOC analytes in soil.

Table 3 – VOCs in Soil QC Limits

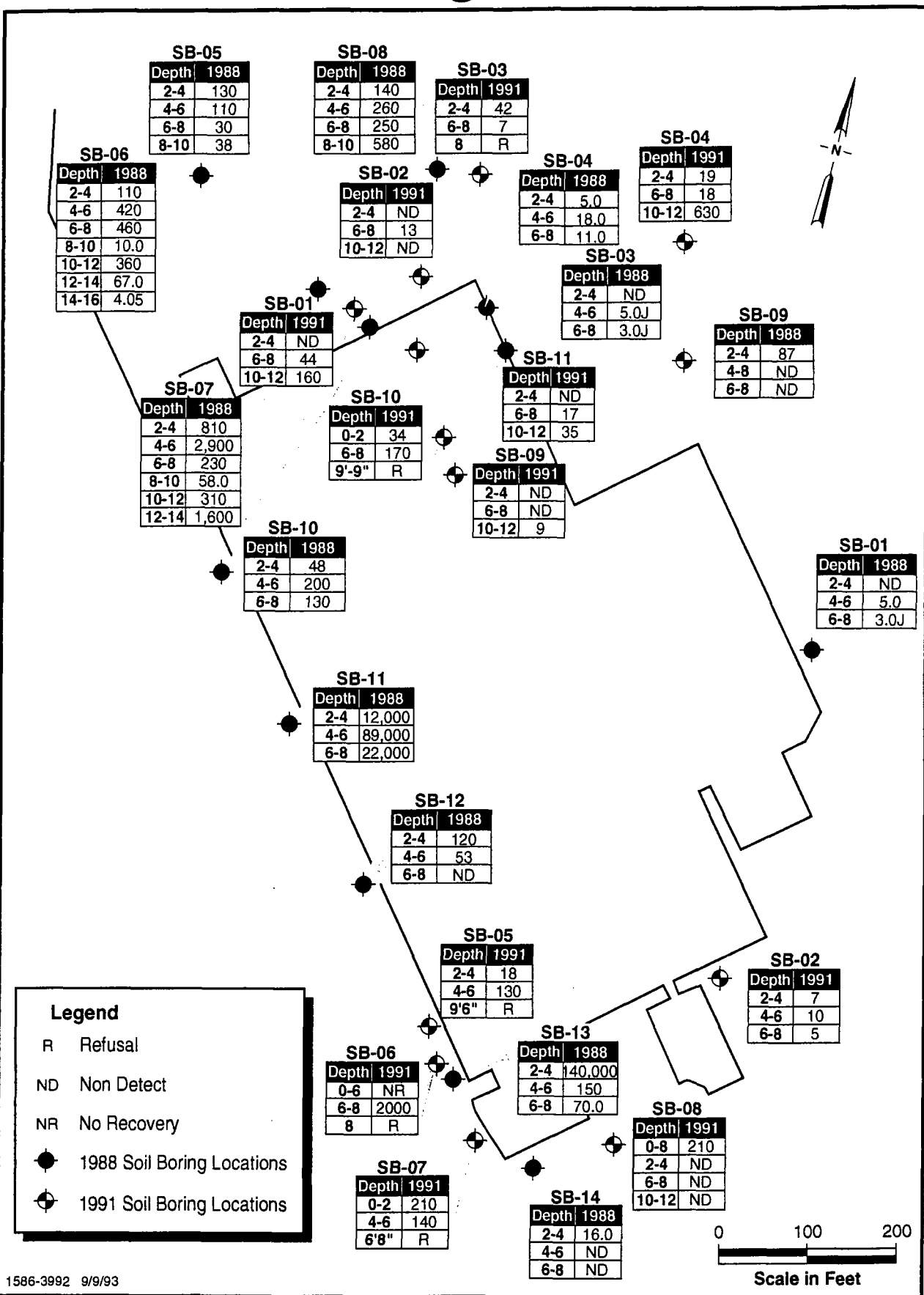
Analyte	MS/MSD %Recovery	MS/MSD %RPD	Surrogate %Recovery
1,1,1-Trichloroethane	65-135	20	NA
Trichloroethene (TCE)	64-132	20	NA
Tetrachloroethene (PCE)	60-136	20	NA
Toluene-d8	NA	NA	8-120
Bromofluorobenzene	NA	NA	80-120
1,2-Dichloroethane-d4	NA	NA	80-120

NA – Not Applicable



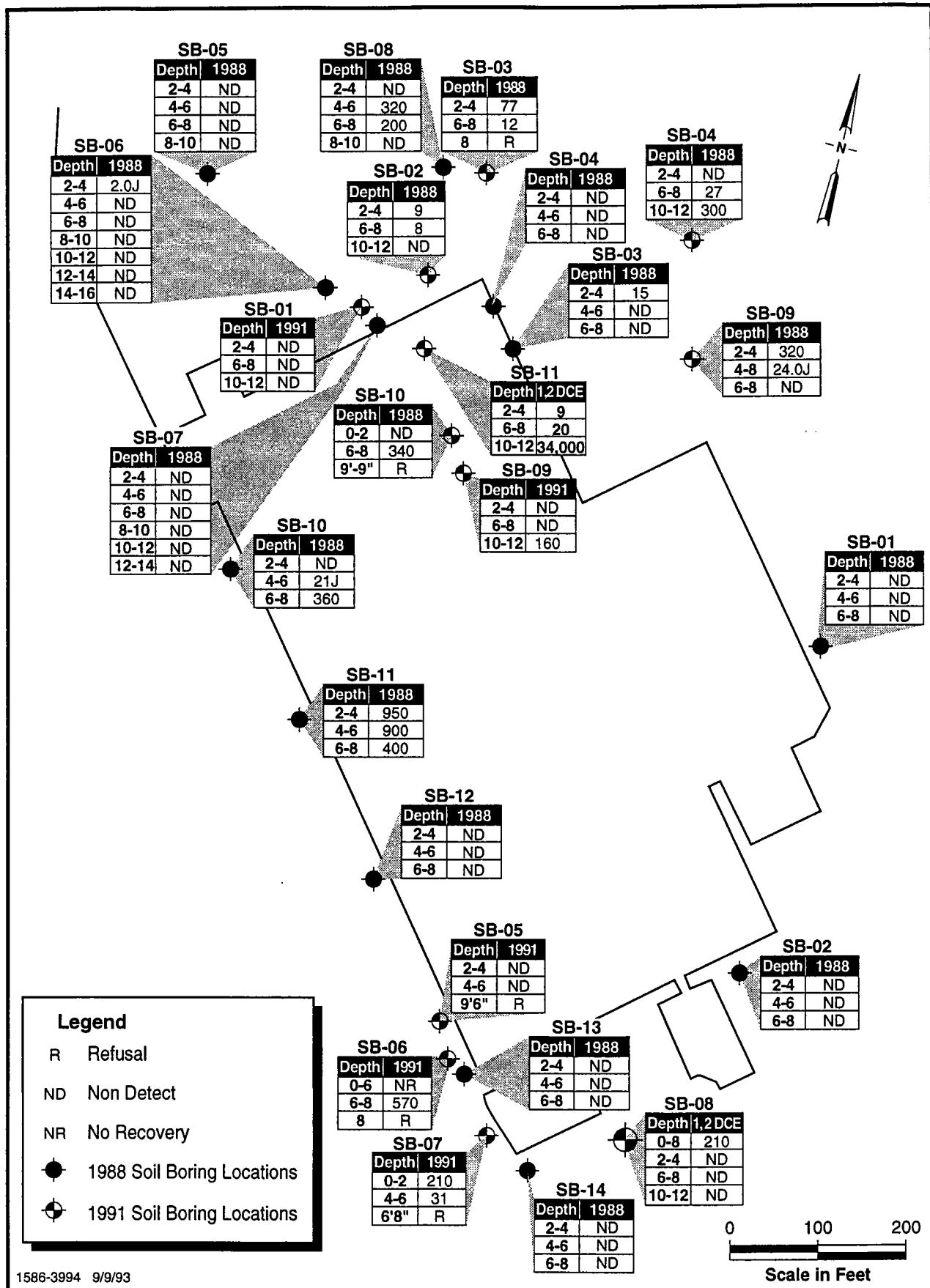
00P-0950 5/3/00

FIGURE 1 PREVIOUS AND PROPOSED SOIL BORING LOCATIONS



1586-3992 9/9/93

FIGURE 2-1 TRICHLOROETHENE (TCE) CONCENTRATIONS (ug/kg) IN SOIL BORING SAMPLES



1586-3994 9/9/93

FIGURE 2-4 1,2 DICHLOROETHENE (1,2-DCE) CONCENTRATIONS (ug/kg) IN SOIL BORING SAMPLES

ATTACHMENT III

1999 Modified Groundwater Monitoring Report

EH1 - 183

August 4, 2000

DE-9J

CERTIFIED MAIL

RETURN RECEIPT REQUESTED

P 140 677 244

Mr. Jeffrey Burman
EKCO Housewares, Inc.
359 State Avenue, Ext. N.W.
P.O. Box 560
Massillon, Ohio 44648-0560

RE: QAPP Approval with Modifications
EKCO Housewares, Inc.
OHD 045 205 424

Dear Mr. Burman:

The United States Environmental Protection Agency (U.S. EPA) has completed a review of the June 30, 2000 submittal from Roy F. Weston, Inc. for the EKCO facility in Massillon, Ohio. The submittal included recovery well mass removal calculations, a Geoprobe Soil Sampling Quality Assurance Project Plan (QAPP) Addendum, and the 1999 Groundwater Monitoring Report.

The main purpose of the June 30, 2000 submittal was to present a soil sampling program capable of determining the current concentrations of contaminants in on-site soils. EKCO believes that in the nine years that have passed since the last soil sampling event, contaminant concentrations may have significantly decreased which may result in the reduction and/or elimination of proposed soil remediation areas. However, if contaminant concentrations are still found to exceed appropriate soil cleanup levels in these areas, U.S. EPA's proposed remedy of soil vapor extraction (SVE) will be required to protect human health and the environment.

U.S. EPA approves the June 30, 2000 submittal with the enclosed modifications. The soil sampling described in the submittal, as modified by U.S. EPA, is expected to be performed in August 2000, concurrent with the modified groundwater sampling program.

If you have any questions regarding the enclosed modifications,
please contact me at (312) 886-7566.

Sincerely yours,

Kenneth S. Bardo

Kenneth S. Bardo
Corrective Action Section

Enclosures (3)

cc: Matthew Basso, American Home Products Corporation
C. Richard Springer, Borden, Inc.
Thomas Cornuet, Roy F. Weston, Inc.
Karen Nesbit, Ohio EPA

DE-9J:KBARDO:6-7566:kb:08/04/00

EKCO VOC Sampling Approval

Is your **RETURN ADDRESS** completed on the reverse side?

SENDER: ■ Complete items 1 and/or 2 for additional services. ■ Complete items 3, 4a, and 4b. ■ Print your name and address on the reverse of this form so that we can return this card to you. ■ Attach this form to the front of the mailpiece, or on the back if space does not permit. ■ Write "Return Receipt Requested" on the mailpiece below the article number. ■ The Return Receipt will show to whom the article was delivered and the date delivered.		3. Article Addressed to: Jeff Burman Eko Housewares P.O. Box 560 Massillon, OH 44648-0560	
5. Received By: (Print Name) GORDON T NEAL	6. Signature: (Addressee or Agent) X Gordon T Neal	4a. Article Number P140 677 244	4b. Service Type <input type="checkbox"/> Registered <input type="checkbox"/> Express Mail <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> COD <input checked="" type="checkbox"/> Certified
7. Date of Delivery 8-1-00		8. Addressee's Address (Only if requested and fee is paid)	

PS Form 3811, December 1994

Domestic Return Receipt

OFFICIAL

Thank you for using Return Receipt Service.

P 140 677 244

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail (See reverse)

Sent to **Jeff Burman**
Street & Number **P.O. Box 560**
Post Office, State, & ZIP Code **Massillon OH 44648**

Postage \$ **.99**
Certified Fee \$ **1.40**
Special Delivery Fee
Restricted Delivery Fee

Return Receipt Showing to Whom & Date Delivered **1.21.00**
Return Receipt Showing to Whom, Date, & Addressee's Address **1**

TOTAL Postage & Fees \$ **3.64**
Postmark or Date

PS Form 3800, April 1995

ENCLOSURE 1

Geoprobe Soil Sampling Quality Assurance Project Plan (QAPP) Addendum

1) Based on soils data presented in the November 1993 Final CMS Report, significant concentration of VOCs were found in four areas as depicted in Figure 2-6 of the Final CMS Report. A review of soils data presented in Figures 2-1 through 2-5 of the Final CMS report generally shows significant detectable concentrations of VOCs at the following locations:

West side of building - SB-10 (1988) and SB-11 (1988);
Southwest corner of building - SB-06 (1991), SB-07 (1991),
and SB-13 (1988);
Northeast corner under building - SB-09 (1991), SB-10
(1991), and SB-11 (1991): and
North side of building - SB-06 (1988), SB-07 (1988), and
SB-08 (1988).

In addition, U.S. EPA notes that detectable concentrations of VOCs were typically found at SB-04 (1991) and SB-09 (1988) located to the east of the northeast corner of the building.

Since January 1, 1998, the U.S. EPA, Region 5 Corrective Action program has required SW-846, Update III methods for determining VOCs in soils (see Enclosure 2). The purpose of the Update III method is to minimize VOC volatilization and biodegradation. Past sampling procedures and methods, including those used at the EKCO facility, are believed to have resulted in underestimating the total VOCs actually present.

In order to ensure that all potential areas of soil contamination are addressed and risks properly assessed during the proposed Geoprobe soil sampling program, U.S. EPA requires that areas identified above be accurately characterized using EPA SW-846, Update III methods. Accordingly, modify Figure 1 showing the 12 proposed soil boring locations to include six additional sample locations at SB-07 (1991), at SB-10 (1988), between SB-09 (1991) and SB-10 (1991), at SB-08 (1988), at SB-04 (1991) and at SB-09 (1988).

2) Soil cleanup goals are calculated and provided in Appendix B of the Final CMS Report. For those VOCs to be analyzed during the proposed Geoprobe soil sampling program, the facility soil cleanup goals provided in the Final CMS Report are:

<u>VOC</u>	<u>Soil Cleanup Goal</u>
1,1-DCE	0.7 mg/kg
1,2-DCE	9.6 mg/kg
1,1,1-TCA	49.5 mg/kg
TCE	1.0 mg/kg
PCE	-
Vinyl Chloride	-

Soil cleanup goals are not presented for PCE or vinyl chloride. Determine the soil cleanup goals for these two VOCs prior to sampling.

3) U.S. EPA conducted an analysis of the facility soil cleanup goals presented in Appendix B of the Final CMS Report compared to generic soil screening levels (SSLs) for migration to groundwater found in the *Soil Screening Guidance: Technical Background Report* (EPA/540/R-95/128, May 1996). The analysis shows that the facility soil cleanup goal concentrations are at least an order of magnitude greater than the SSLs using a dilution attenuation factor of 20 (for example, TCE concentrations of 1.0 mg/kg versus 0.06 mg/kg and 1,2-DCE concentrations of 9.6 mg/kg versus 0.7 mg/kg). The soil cleanup goal concentrations are also at least an order of magnitude higher than the corresponding EPA Region 5 Risk-Based Screening Levels (see Enclosure 3).

The EPA soil screening guidance model uses a simple linear equilibrium soil/water partition to estimate contaminant release in soil leachate and a simple water-balance equation to calculate a dilution factor to account for reduction of soil leachate from mixing in an aquifer. The method used in the Final CMS Report to calculate the facility soil cleanup goals is the Summers Model (EPA/540/2-89/057).

U.S. EPA needs assurances that the facility-specific soil cleanup goals meet current guidelines for protecting groundwater. Compare and discuss the differences in the two models. Update the facility soil cleanup goals for the VOC analyte list provided in Element 9 of the QAPP Addendum by using the SSL calculation methods provided in the soil screening guidance. Use these updated facility soil cleanup goals in the reassessment of soil remediation.

4) A schedule for undertaking soil sampling and submitting the final soil sampling report described in Element 6 of the QAPP Addendum is not included. The soil sampling program must be initiated no later than September 1, 2000. The report is due to U.S. EPA within 45 days of receipt of all analytical results.

5) Specific procedures for collecting, handling, and preserving soil samples for VOC analysis in accordance with Method 5035 are not included in the QAPP Addendum. EKCO must provide a field sampling SOP to U.S. EPA for review and approval that outlines the specific procedures to be used in accordance with Method 5035 (e.g., EnCore® sampling, type of preservation, field check for effervescence when preserving with sodium bisulfate) prior to sampling. EKCO must also ensure that the on-site BL Analytical lab and/or the off-site Aqua Tech Environmental Laboratories are capable of collecting and analyzing soil samples using Method 5035 in conjunction with Method 8260B (including low and high level analysis). Provide the laboratory SOP for purge and trap for VOCs by Method 5035/Method 8260B prior to sampling. It is important that the sampling team coordinate with the laboratory so that valid data is generated.

6) Proper QA/QC to be implemented during the Geoprobe soil sampling program must include: one set of trip blank samples for each sample cooler containing samples; one set of equipment blank samples each day for non-dedicated sampling devices; field duplicate samples to be collected at a rate of 1 for every 10 samples to be analyzed; and MS/MSD pairs to be collected at a rate of 1 for every 20 samples.

7) Page 3 of Element 6 of the QAPP Addendum proposes field screening prior to sampling. It is important that field screening with the TVA does not allow the open soil core to be exposed to the atmosphere for any significant length of time. In order to minimize volatilization, samples for laboratory analysis must be immediately taken upon opening of the sample tubes and placed on ice. Screening samples from the same zone can be taken at that time and placed in clean glass VOA vials or polyethylene bags. Upon screening with the TVA, preserved soil samples from the zone to be analyzed can be sent to the laboratory. Provide a field SOP for TVA screening to U.S. EPA for review and approval prior to sampling.

1999 Groundwater Monitoring Report

1) The groundwater elevations presented in Table 4-1 bear no resemblance to the groundwater elevations portrayed in Figures 4-1 through 4-6. Confirm the data and modify the table and/or figures accordingly.

2) In Figure 4-6, the groundwater contours in the vicinity of R-2, R-4, and R-10 are not accurate provided that the groundwater elevations shown are correct. Groundwater would be expected to

flow from R-2 toward R-10, whereas the contours show groundwater flow from R-10 toward R-2.

3) Figures 4-7 through 4-10 provide graphs that are used to better evaluate the data for potential increasing or decreasing trends. As a result, EKCO concludes that five of the eight wells being monitored exhibit a decreasing trend, two wells exhibit no trend, and one well exhibits an increasing to decreasing to stable trend.

Conclusions regarding any trends must be supported by a statistical analysis. Conduct a statistical analysis for each contaminant of concern at each well to confirm these observed trends (e.g., Mann-Kendall trend analysis). A statistical analysis will provide a more conclusive determination of the effectiveness of the ongoing groundwater remediation system.

December 22, 1997

MEMORANDUM

SUBJECT: Determination of Volatiles in Soil - Directive for Change

FROM: Norman R. Niedergang, Director
Waste, Pesticides and Toxics Division

TO: Corrective Action Project Managers
QA Staff

I. INTRODUCTION/SUMMARY

Soil/Solids traditionally have been collected for volatile organic determinations using "low concentration volatiles in soil" techniques described in Update II to SW-846, or earlier editions. Update III to SW-846, published June 13, 1997, deleted the "low concentration volatiles in soil" sample collection/laboratory procedure. Update III mandates that analysis aliquots (field or off-site lab) be collected in the VOA vial (with TFE lined septa cap) used for laboratory analysis. Either a methanol extraction reagent or a matrix modifying reagent are to be added to a soil aliquot at time of sample collection. Separate soil samples are collected for percent moisture determinations for reporting volatile results on a dry weight basis.

Technical and QA staff of our Waste, Pesticides and Toxics Division (WPTD) have reviewed and disseminated published experimental data comparing Update II and Update III soil sample collection techniques for volatile organics. Our Division has supported some of this work through the UST program in Wisconsin. Update III sample collection techniques are more complicated and tedious for volatiles than those of Update II; however, the accuracy of the modern Update III soil collection techniques warrant their immediate use versus traditional methods. Previous methodology has been shown to significantly under-report the presence of volatiles in soil.

II. DIRECTIVE

1. Starting January 1, 1998, all RCRA Corrective Actions and Underground Storage Tank (UST) activities under the direct control of the Waste, Pesticides and Toxics Division will determine volatiles in soil using sample collection procedures

consistent with Methods 5021 or 5035 of Update III to SW-846, "Test Methods

for Evaluating Solid Waste" as published in Federal Register of June 13, 1997, Vol. 62, No. 114, pp. 32452-463.

2. If Work Plan/Quality Assurance Project Plans (QAPPs) were approved prior to January 1, 1998 using the traditional "low-concentration volatiles in soil" procedures of Update II to SW-846, these documents are to be modified for future sampling, done after January 1, 1998 to reflect use of Update III techniques for soil/solids. Significant numbers of corrective action soil surveys are not expected to occur during first quarter of calendar year 1998. Time should be available to update sample collection/laboratory test procedures for soil volatiles. Updating these documents will be a high priority of the QA staff. Any exceptional circumstances that suggest use of the old procedure must be brought to the attention of the Corrective Action Process Manager and QA staff no later than January 15, 1998.
3. Although Update III to SW-846 was effective June 13, 1997, EPA's Office of Solid Waste, in a policy memorandum, recommended Update III changes be cautiously implemented to allow laboratory and sampling organizations time to purchase new instrumentation/equipment. A six (6) month delay in implementing Update III was suggested, and this is equivalent to the above January 1, 1998 date.
4. Update III to SW-846 provides three (3) options for volatile determinations of soil, either at on-site field labs, or for off-site analytical support laboratories.
 - a. Soils will be collected and tested using only the methanol extract option of Method 5035.
 - b. Soils will be collected and tested using both the methanol extract option of Method 5035 for large volatile concentrations and either one of the low concentration procedures of Method 5021/5035.
 - c. Alternatively, soils can be collected using the En-Core (or equivalent) sampler for subsequent sample preparation by Methods 5021 or 5035 in a field or off-site laboratory.

The need and use of a low concentration option from Method 5021 or Method 5035 will be determined for each Corrective Action or UST activity based on Data. Quality Objectives, risk, project needs, intended data use, etc. This directive does not apply to in-situ field determinations of volatiles in soil. Attached to this Directive is a table identifying EPA Region 9 Soil Preliminary Remedial Goals

and Superfund Soil Screening Levels whose values for volatiles are less than 200 ppb. The table identifies critical volatile compounds that may dictate use of low concentration options. The 200 ppb cutoff is taken from SW-846 guidance. This criteria may vary for specific lab instrumentation.

5. It is relatively easy to implement the methanol extraction for sample collection/laboratory analysis. Volatile soil determinations, using methanol, are done using the same instrumentation currently in place for waters. Many or most laboratories are now purchasing sample preparation instrumentation necessary for the low concentration option of Method 5035, or for Method 5021, hence the 6-month delay in implementation. Consistent use of Update III will provide a level playing field for sampling/lab organizations.
6. U.S. EPA contractor support (e.g.,-oversight activities) for RCRA Corrective Action or UST activities, will determine volatiles in soil/solids using Update III procedures.
7. Soils/samples tested at the Region 5 Central Regional Laboratory for the WPTD will determine soil volatiles consistent with Update III.

III. DETAILED BACKGROUND

The analysis of volatile organic compounds, or volatiles in soil commonly has utilized collection of a soil in a 40-60 ml VOA vial with TFE lined septa, refrigerated transport to a laboratory (field or off-site), and soil subaliquots (2-5) selected by the laboratory for heated purge and trap GC or GC/MS analysis. This process has been known as the "low concentration volatiles in soil" test procedure. For medium or high level volatile concentrations in soil, the laboratory could alternatively extract the soil with water-miscible methanol extraction solvent and then test the methanol extract (after dilution) as they would for water. Methanol extraction values were traditionally a very minor part of all volatile soil data reported.

A large body of state, federal, and private research, independent from operational EPA staff and programs, has demonstrated the above "low concentration volatiles in soil" methodology to be inaccurate and biased low versus sample collection in the specific VOA containers used for laboratory analysis (field or lab). Negative errors are commonly observed for the traditional technique and are caused by a variety of field/transport/lab volatile concentration losses.

Update III to SW-846, published in the June 13, 1997 Federal Register, deleted the "low concentration volatiles in soil" protocol from the manual and replaced it with the following three (3) alternatives:

1. Method 5021 - Heated Head Space. This is applicable to volatile concentration below 200 ppb.

2. Method 5035 - Heated Purge and Trap (Low Concentration Option in range of 5 to 200 ppb). Five (5) mls of a matrix modifying solution is added to 2-5g of soil at time of sample collection.
3. Method 5035 - Methanol Extract (High Concentration Option for volatiles exceeding 200 ppb). Methanol is added to 2-5g of soil at time of collection, then subsequently diluted with water and tested for volatiles by Method 5030.

All of the three alternatives require a tared VOA vial with matrix modifying solution or methanol, addition of 2-5g soil at time of collection to the vial, and then a final vial weight to determine soil aliquot weight by difference. Separate vials are used for the collection and determination of soil moisture content.

The above options can be implemented in several ways depending on field or off-site lab capability or based on Data Quality Objectives.

1. A separate VOA vial is always collected for a percent moisture value.
2. A single methanol extract VOA vial is collected for each soil site to provide for volatile concentrations exceeding 200 ppb. Analyses can be repeated, since the methanol extract is easily rediluted.
3. Two or more low concentration option VOA vials (Methods 5021 or 5035) are collected for each soil site. One is necessary for concentration measurements below 200 ppb - the other serves as a backup for any reanalyses. The heated headspace analysis (Method 5021) can be repeated using a different or smaller air volume.
4. The methanol extract VOA vial alone may suffice for many soil surveys. The low level options of Methods 5021 and 5035 may be unnecessary, depending on DQOs or risk assessment values. A unique aspect of methanol extracts is that soils can be composited for volatiles via their methanol extracts.
5. Method 5035 specifies/approves the use of the En-Core proprietary/patented soil sampler, as an alternative to use of methanol reagent in the field. This sampler can collect 5g soil cores with no loss in sample integrity if transported to a lab within two days of sample collection. Sample preparation can then be done by any of the above techniques.

The above procedures and alternatives are more complicated and tedious than the traditional "low-concentration volatiles in soil," however, their accuracy warrants and justifies their use versus the traditional techniques. The new procedures require careful coordination between

field and lab personnel and use of VOA vials that are compatible with specific laboratory instrumentation. For more information, or assistance in choosing the new option best suited to project objectives, please consult with QA staff members.

Attachment

ATTACHMENT

Volatile Contaminants, whose EPA Region 9 Soil Preliminary Remedial Goals (PRGs) or Superfund Soil Screening Levels:

1. Are less than 200 ppb (ug/kg) threshold/detection of methanol extraction for method 8260; or
2. Between 200 and 1,000 ppb (0.2 - 1.0 ppm), where quantitation is uncertain for method 8260 after methanol extraction of soil.

Tap Water PRGs which are less than 1 ug/L (ppb) (threshold of Method 8260) are listed for comparison.

(If Soil PRG is greater than 1,000 ppb or 1.0 ppm, it is not listed and methanol extraction should be successful for risk assessment.)

Volatile Contaminant Group	Soil Residential PRG (ug/kg or ppb) (<200) (200-1000)	Soil Industrial PRG (ug/kg or ppb) (<200) (200-1000)	Superfund Soil Screening level-DAF 20 (ug/kg or ppb) (<200) (200-1000)	Tap Water PRG (ug/L) (<1)
<u>Appendix IX Hydrocarbon:</u>				
benzene (ca)	630		30	0.39
<u>Non Appendix IX Hydrocarbon:</u>				
1,3 butadiene (ca)	6.5	14	Not Available	.011
<u>Common Appendix IX Halogenated Hydrocarbons:</u>				
bromomethane (nc)			800	
carbon tetrachloride (ca)	230	500	70	.17
1,2 dichloroethane (ca)	250	550	20	.12
1,1 dichloroethene (ca)	37	80	60	.046
cis-1,2 dichloroethene (nc)			400	
trans-1,2 dichloroethene (nc)			700	
1,2 dichloropropane (ca)	310	680	30	.16
1,3 dichloropropene (ca)	250	550	4	.081
methylene chloride (ca)			20	4.3 (lab cont.)
Volatile Contaminant Group	Soil Residential PRG (ug/kg or ppb) (<200) (200-1000)	Soil Industrial PRG (ug/kg or ppb) (<200) (200-1000)	Superfund Soil Screening level -DAF 20 (ug/kg or ppb) (<200) (200-1000)	Tap Water PRG (ug/L) (<1)

1,1,2,2 tetrachloroethane (ca)	450		3	.055
1,1,1,2 tetrachloroethane (ca)				.43
tetrachloroethene (PCE) (ca)			60	1.1
1,1,2 trichloroethene (ca)	650		20	.20
Vinyl chloride	16	35	10	.02
1,4 dichlorobenzene (ca)				.47
<u>Non Appendix IX Halogenated Hydrocarbons:</u>				
vinyl bromide (ca)	190		410	.10
<u>Appendix IX Trihalomethanes:</u>				
chloroform (ca)	250	530	600	.16
bromodichloromethane (ca)	630		600	.18
Dibromochloromethane (ca)			400	1.0
Bromoform (ca)			800	
<u>Specialized Appendix IX Halogenated Hydrocarbons:</u>				
1,2 dibromo-3- chloropropane (DBCP) (ca)	320		Not Available	.048
1,2 dibromoethane (EDB) (ca)	4.9	20	Not Available	.00076
1,4 dichloro-2-butene (ca)	7.5	100	Not Available	.0012
1,2,3 trichloropropane (ca)	1.4	3.1	Not Available	.0016
Volatile Contaminant Group	Soil Residential PRG (ug/kg or ppb) (<200) (200-1000)	Soil Industrial PRG (ug/kg or ppb) (<200) (200-1000)	Superfund Soil Screening Level- DAF 20 (ug/kg or ppb) (<200) (200-1000)	Tap Water PRG (Ug/L) (<1)
<u>Appendix IX Water -- Miscible Volatiles:</u>				
acrolein (nc)	100	340*	Not Available	.042

acrylonitrile	190	470*	Not Available	3.7*
1,4 dioxane			Not Available	1.0*
methacrylonitrile (nc)	2,000*		Not available	
acetonitrile (nc)			Not Available	71*
<u>non Appendix IX</u> <u>Water Miscible</u> <u>Volatiles:</u>				
acrylamide (ca)	980		Not Available	.015
ethyl acrylate (ca)	210	450	Not Available	.23
ethylene oxide (ca)	130	320	Not Available	.024
malonitrile (nc)	1,300*		Not Available	.73
propylene oxide (ca)	Not Available	Not Available	Not Available	.22

Ca) - Cancer PRG

(Nca) - noncancer PRG

*All water miscible volatiles have poor purging efficiencies by method 8260. Detection limits are elevated for method 8260 for these types of volatiles. Asterisked volatile criteria are adjusted for purging efficiency. 1,4 dioxane has less than 1% purging efficiency at room temperature.

EPA Region 5:
Model Quality Assurance Project Plan

Appendix D

Risk-Based Screening Levels

A. INTRODUCTION

The Human Health Risk-Based Screening Levels (RBSLs) contained in this Appendix are intended to support QAPP ELEMENT 3: PROJECT DESCRIPTION. As explained in QAPP ELEMENT 3, the RBSLs have two essential purposes: 1) to assist in the selection of chemical constituent detection limits/reporting limits that will result in analytical data with appropriate sensitivity for entry into a risk assessment; and 2) to provide generic constituent screening concentrations (i.e., for soil and groundwater samples) which may be compared to the site-specific constituent concentration data obtained during the RFI. The purpose of the comparison is to support decisions for "no further action" or "no further investigation" for individual chemical constituents at a particular Solid Waste Management Unit (SWMU) or Area of Concern (AOC).

The rationale for the risk-based screening approach is explained in detail in the following U.S. EPA documents: 1) *Soil Screening Guidance: User's Guide* (OSWER Publication 9355.4-23; April 1996); 2) *Soil Screening Guidance: Technical Background Document* (OSWER Publication 9355.4-17A; EPA/540/R-95/128; May 1996); and *Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities: Advanced Notice of Proposed Rulemaking* (Federal Register 61: 19432-19464, 1996).

These guidance documents explain EPA's intention to implement the risk-based screening approach for the Agency's major site remediation and corrective action programs (i.e., Superfund and RCRA). According to this approach, individual chemical constituents present at a facility undergoing corrective action may be eliminated from further investigation/action by comparison of each site-specific constituent concentration to a pre-determined screening concentration level. Please note that effective site characterization of chemical constituents (i.e., identity, concentration, media type, migration potential, etc.) is the key factor which ensures that comparison of site-specific analytical data with pre-determined screening levels will result in accurate and protective decisions.

The *Technical Background Document* includes tables of generic soil screening levels (SSLs) which were developed for the chemicals detected most frequently at Superfund sites. The calculated generic screening levels rely on specific risk-based assumptions and parameters that result in the following limitations:

- A. The SSLs were calculated for approximately 110 chemicals. However, RCRA corrective

action can include a much larger list of potential chemicals of concern. Therefore, many potential RCRA constituents are not included in the SSL guidance.

- B. The SSLs were calculated using parameters that are based on residential land use. If non-residential land uses (e.g., industrial, agricultural, recreational) are proposed and appropriate, then screening levels based on the proposed non-residential uses must be developed.
- C. The SSLs are based on default exposure pathways (direct soil ingestion and inhalation of contaminants or particulate matter) as well as modeled pathways (migration of chemicals from soil to ground water). If other exposure pathways (e.g., dermal exposure, food chain exposure) apply to a facility because of location, the type of chemicals of concern, or the potential receptors, then these additional pathways must be included in the development of the screening levels.

B. CONTENTS OF TABLE

In order to address the limitations described above and provide generic risk-based screening levels for a wide range of potential target constituents, the Region 5 RCRA program has adopted the following approaches in developing the attached **TABLE of RBSLs**:

1. For constituents which have generic SSLs established and listed in Appendix A of the *Technical Background Document*, the Table of RBSLs displays the same values. The generic SSLs are presented in separate columns based on the major pathways of potential exposure, which are: direct **ingestion** of soil, **inhalation** of volatiles for organic constituents and mercury, and **inhalation** of fugitive particles for inorganic constituents. A third column displays the generic SSL values for **Protection of Ground Water** in order to account for migration of soil contaminants to ground water. The value displayed is based on the use of a default dilution-attenuation factor (DAF) of 20 to account for natural processes which reduce contaminant concentrations in the subsurface.

NOTE : The following general criteria should be employed to select the appropriate RBSL for a specific chemical constituent: if more than one exposure pathway to soil contaminants is possible at a particular SWMU or AOC, then the pathway with the lowest SSL should be used as the RBSL.

2. For additional chemical constituents (i.e., RCRA constituents) which do not have generic SSL values established in the *Technical Background Document*, the soil RBSLs displayed in the Table of RBSLs were adopted from the EPA *Region 9 Preliminary Remediation Goals (PRGs)* (EPA Region 9; August 1996). In the Region 9 approach, the soil PRGs were established based on exposure of the same receptor to a combination of soil ingestion, inhalation of volatiles or fugitive particles, and dermal exposure.

3. The RBSLs discussed in items #1 and #2 above apply only to the current and/or future residential land use scenario. At many RCRA corrective action sites, it may also be appropriate to assume that a current and/or future industrial land use scenario should apply. For this situation, the "Industrial Soil" RBSL values displayed in the Table of RBSLs were also adopted from the EPA Region 9 PRGs.
4. For chemical constituents in groundwater, EPA has a throughout-the-plume/unit boundary point of compliance policy for ground water, and expects all usable ground waters to be returned to their maximum beneficial uses wherever practicable. Consequently, for screening purposes, the ground water RBSLs should always account for the potential residential use of ground water. Therefore, for risk-based screening of chemical constituents in ground water, Maximum Contaminant Levels (MCLs) have been adopted as ground water RBSLs. Chemical constituents which possess final MCLs are listed in a separate column in the Table of RBSLs. However, MCLs exist for less than 100 chemicals (*Drinking Water Regulations and Health Advisories; EPA 822-B-96-002; October 1996*). For chemical constituents which do not have a final MCL, the EPA Region 9 PRG value for drinking water should be used as the ground water RBSL. These values are listed in the final column in the Table of RBSLs. **NOTE:** As stated earlier in QAPP ELEMENT 3, some States have ground water remediation criteria that are more stringent than Federal MCL values for certain chemical constituents. It is suggested that QAPP writers and RCRA project managers should review the appropriate State ground water remediation standards before deciding on final ground water RBSLs for a given site.

TABLE OF RISK-BASED SCREENING LEVELS

May, 1998

CAS No.	Constituent	Soil Screening Level (mg/kg)					GW Screening Level (ug/L)	
		Ingestion	Inhalation	Protection of GW ^a	Region 9 PRG		MCL	R9 PRG ^b
					Residential	Industrial		
83-32-9	Acenaphthene	4700	---	570	NA	1.1E+02	---	3.7E+02
208-96-8	Acenaphthylene	---	---	---	---	---	---	---
67-64-1	Acetone	7800	100000	16	NA	8.8E+03	---	6.1E+02
75-05-8	Acetonitrile; Methyl cyanide	---	---	---	2.2E+02	1.2E+03	---	7.1E+01
98-86-2	Acetophenone	---	---	---	4.9E-01	1.6E+00	---	4.2E-02
53-96-3	2-Acetylaminofluorene; 2-AAF	---	---	---	---	---	---	---
107-02-8	Acrolein	---	---	---	1.0E-01	3.4E-01	---	4.2E-02
107-13-1	Acrylonitrile	---	---	---	1.9E-01	4.7E-01	---	3.7E+00
309-00-2	Aldrin	0.04	3	0.5	NA	1.1E-01	---	4.0E-03
107-05-1	Allyl chloride	---	---	---	3.2E+03	3.3E+04	---	1.8E+03
92-67-1	4-Aminobiphenyl	---	---	---	---	---	---	---
62-53-3	Aniline	---	---	---	1.9E+01	2.0E+02	---	1.1E+01
120-12-7	Anthracene	23000	---	12000	NA	5.7E+00	---	1.8E+03
7440-36-0	Antimony	31	---	5	NA	6.8E+02	---	1.5E+01
140-57-8	Aramite	---	---	---	1.8E+01	7.6E+01	---	2.7E+00
7440-38-2	Arsenic	0.4	750	29	NA	2.4E+00	---	4.5E-02
7440-39-3	Barium	5500	690000	1600	NA	1.0E+05	---	2.6E+03
71-43-2	Benzene	22	0.8	0.03	NA	1.4E+00	5	3.9E-01
56-55-3	Benzo[a]anthracene; Benzanthracene	0.9	---	2	NA	2.6E+00	---	9.2E-02
205-99-2	Benzo[b]fluoranthene	0.9	---	5	NA	2.6E+00	---	9.2E-02
207-08-9	Benzo[k]fluoranthene	9	---	49	NA	2.6E+01	---	9.2E-01
191-24-2	Benzo[g,h,i]perylene	---	---	---	---	---	---	---
50-32-8	Benzo[a]pyrene	0.09	---	8	NA	2.6E-01	0.2	9.2E-03
100-51-6	Benzyl alcohol	---	---	---	2.0E+04	1.0E+05	---	1.1E+04
7440-41-7	Beryllium	0.1	1300	63	NA	1.1E+00	---	1.6E-02
319-84-6	alpha-BHC	0.1	0.8	0.0005	NA	3.0E-01	---	1.1E-02
319-85-7	beta-BHC	0.4	---	0.003	NA	1.1E+00	---	3.7E-02
319-86-8	delta-BHC	---	---	---	---	---	---	---
58-89-9	gamma-BHC; Lindane	0.5	---	0.009	NA	1.5E+00	0.2	5.2E-02
111-91-1	Bis(2-chloroethoxy)methane	---	---	---	---	---	---	---
111-44-4	Bis(2-chloroethyl)ether	0.6	0.2	0.0004	NA	9.7E-02	---	9.8E-03

See text for source references. "—" = value is not currently available. "NA" = value is not applicable for this constituent refer to the SSL values given in the columns labeled "Ingestion", "Inhalation" and "Protection of GW."

TABLE OF RISK-BASED SCREENING LEVELS

May, 1998

CAS No.	Constituent	Soil Screening Level (mg/kg)					GW Screening Level (ug/L)	
		Ingestion	Inhalation	Protection of GW ^a	Region 9 PRG		MCL	R9 PRG ^b
					Residential	Industrial		
	Bis(2-chloro-1-methylethyl) ether; 2,2-							
108-60-1	Dichlorodiisopropyl ether	---	---	---	6.3E+00	2.7E+01	---	9.6E-01
117-81-7	Bis(2-ethylhexyl) phthalate	46	31000	3600	NA	1.4E+02	---	4.8E+00
75-27-4	Bromodichloromethane	10	3000	0.6	NA	1.4E+00	---	1.8E-01
75-25-2	Bromoform; Tribromomethane	81	53	0.8	NA	2.4E+02	---	8.5E+00
101-55-3	4-Bromophenyl phenyl ether	---	---	---	---	---	---	---
85-68-7	Butyl benzyl phthalate; Benzyl butyl phthalate	16000	930	930	NA	9.3E+02	---	7.3E+03
7440-43-9	Cadmium	78	1800	8	NA	8.5E+02	---	1.8E+01
75-15-0	Carbon disulfide	7800	720	32	NA	2.4E+01	---	2.1E+01
56-23-5	Carbon tetrachloride	5	0.3	0.07	NA	5.0E-01	---	1.7E-01
57-74-9	Chlordane	0.5	20	10	NA	1.5E+00	---	5.2E-02
106-47-8	p-Chloroaniline	310	---	0.7	NA	2.7E+03	---	1.5E+02
108-90-7	Chlorobenzene	1600	130	1	NA	2.2E+02	---	3.9E+01
510-15-6	Chlorobenzilate	---	---	---	1.6E+00	7.1E+00	---	2.5E-01
59-50-7	p-Chloro-m-cresol	---	---	---	---	---	---	---
75-00-3	Chloroethane; Ethyl chloride	---	---	---	1.1E+03	1.6E+03	---	7.1E+02
67-66-3	Chloroform	100	0.3	0.6	NA	5.3E-01	---	1.6E-01
91-58-7	2-Chloronaphthalene	---	---	---	1.1E+02	1.1E+02	---	4.9E+02
95-57-8	2-Chlorophenol	390	53000	4	NA	3.7E+02	---	3.8E+01
7005-72-3	4-Chlorophenyl phenyl ether	---	---	---	---	---	---	---
126-99-8	Chloroprene	---	---	---	3.6E+00	1.2E+01	---	1.4E+01
7440-47-3	Chromium (total)	390	270	38	NA	4.5E+02	---	---
218-01-9	Chrysene	88	---	160	NA	7.2E+00	---	9.2E+00
7440-48-4	Cobalt	---	---	---	4.6E+03	9.7E+04	---	2.2E+03
7440-50-8	Copper	---	---	---	2.8E+03	6.3E+04	---	1.4E+03
108-39-4	m-Cresol	---	---	---	3.3E+03	3.4E+04	---	1.8E+03
95-48-7	o-Cresol	3900	---	15	NA	3.4E+04	---	1.8E+03
106-44-5	p-Cresol	---	---	---	3.3E+02	3.4E+03	---	1.8E+02
57-12-5	Cyanide	1600	---	40	NA	1.4E+04	---	7.3E+02
94-75-7	2,4-D; 2,4-Dichlorophenoxyacetic acid	---	---	---	6.5E+02	6.8E+03	70	3.7E+02
72-54-8	4,4'-DDD	3	---	16	NA	7.9E+00	---	2.8E-01

See text for source references. "—" = value is not currently available. "NA" = value is not applicable for this constituent; refer to the SSL values given in the columns labeled "Ingestion", "Inhalation" and "Protection of GW."

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May, 1998

CAS No.	Constituent	Soil Screening Level (mg/kg)					GW Screening Level (ug/L)	
		Ingestion	Inhalation	Protection of GW ^a	Region 9 PRG		MCL	R9 PRG ^b
					Residential	Industrial		
72-55-9	4,4'-DDE	2	---	54	NA	5.6E+00	---	2.0E-01
50-29-3	4,4'-DDT	2	---	32	NA	5.6E+00	---	2.0E-01
2303-16-4	Diallate	---	---	---	7.3E+00	3.1E+01	---	1.1E+00
53-70-3	Dibenz[a,h]anthracene	0.09	---	2	NA	2.6E-01	---	9.2E-03
132-64-9	Dibenzofuran	---	---	---	1.4E+02	1.4E+02	---	2.4E+01
124-48-1	Dibromochloromethane; Chlorodibromomethane	8	1300	0.4	NA	2.3E+01	---	1.0E+00
96-12-8	1,2-Dibromo-3-chloropropane; DBCP	---	---	---	3.2E-01	1.4E+00	0.2	4.8E-02
106-93-4	1,2-Dibromoethane; Ethylene	---	---	---	4.9E-03	2.0E-02	---	7.6E-04
84-74-2	Di-n-butyl phthalate	7800	2300	2300	NA	6.8E+04	---	3.7E+03
95-50-1	o-Dichlorobenzene	7000	560	17	NA	7.0E+02	600	3.7E+02
541-73-1	m-Dichlorobenzene	---	---	---	5.0E+02	8.6E+02	---	1.8E+02
106-46-7	p-Dichlorobenzene	27	---	2	NA	8.5E+00	75	4.7E-01
91-94-1	3,3-Dichlorobenzidine	1	---	0.007	NA	4.2E+00	---	1.5E-01
110-57-6	trans-1,4-Dichloro-2-butene	---	---	---	---	---	---	---
75-71-8	Dichlorodifluoromethane	---	---	---	9.4E+01	3.1E+02	---	3.9E+02
75-34-3	1,1-Dichloroethane	7800	1300	23	NA	1.7E+03	---	8.1E+02
107-06-2	1,2-Dichloroethane	7	0.4	0.02	NA	5.5E-01	5	1.2E-01
75-35-4	1,1-Dichloroethylene	1	0.07	0.06	NA	8.0E-02	7	4.6E-02
156-60-5	trans-1,2-Dichloroethylene	1600	3100	0.7	NA	2.7E+02	100	1.2E+02
120-83-2	2,4-Dichlorophenol	230	---	1	NA	2.0E+03	---	1.1E+02
87-65-0	2,6-Dichlorophenol	---	---	---	---	---	---	---
78-87-5	1,2-Dichloropropane	9	15	0.03	NA	6.8E-01	5	1.6E-01
542-75-6	1,3-Dichloropropene (mixture)	4	0.1	0.004	NA	5.5E-01	---	8.1E-02
10061-01-5	cis-1,3-Dichloropropene ^d	---	---	---	---	---	---	---
10061-02-6	trans-1,3-Dichloropropene ^d	---	---	---	---	---	---	---
60-57-1	Dieldrin	0.04	1	0.004	NA	1.2E-01	---	4.2E-03
84-66-2	Diethyl phthalate	63000	2000	470	NA	1.0E+05	---	2.9E+04
297-97-2	O,O-Diethyl O-2-pyrazinyl phosphorothioate; Thionazin	---	---	---	---	---	---	---
60-51-5	Dimethoate	---	---	---	1.3E+01	1.4E+02	---	7.3E+00
60-11-7	p-(Dimethylamino)azobenzene	---	---	---	---	---	---	---

See text for source references. "—" = value is not currently available. "NA" = value is not applicable for this constituent; refer to the SSL values given in the columns labeled "Ingestion", "Inhalation" and "Protection of GW."

TABLE OF RISK-BASED SCREENING LEVELS

May, 1998

CAS No.	Constituent	Soil Screening Level (mg/kg)					GW Screening Level (ug/L)	
		Ingestion	Inhalation	Protection of GW ^a	Region 9 PRG		MCL	R9 PRG ^b
					Residential	Industrial		
57-97-6	7,12-Dimethylbenz[a]anthracene	---	---	---	---	---	---	---
119-93-7	3,3-Dimethylbenzidine	---	---	---	4.8E-02	2.1E-01	---	7.3E-03
122-09-8	alpha, alpha-Dimethylphenethylamine	---	---	---	---	---	---	---
105-67-9	2,4-Dimethylphenol	1600	---	9	NA	1.4E+04	---	7.3E+02
131-11-3	Dimethyl phthalate	---	---	---	1.0E+05	1.0E+05	---	3.7E+05
99-65-0	m-Dinitrobenzene	---	---	---	6.5E+00	6.8E+01	---	3.7E+00
534-52-1	4,6-Dinitro-o-cresol	---	---	---	---	---	---	---
51-28-5	2,4-Dinitrophenol	160	---	0.3	NA	1.4E+03	---	7.3E+01
121-14-2	2,4-Dinitrotoluene	0.9	---	0.0008	NA	1.4E+03	---	7.3E+01
606-20-2	2,6-Dinitrotoluene	0.9	---	0.0007	NA	6.8E+02	---	3.7E+01
88-85-7	Dinoseb; DNBP; 2-sec-Butyl- 4,6-dinitrophenol	---	---	---	6.5E+01	6.8E+02	7	3.7E+01
117-84-0	Di-n-octyl phthalate	1600	10000	10000	NA	1.0E+04	---	7.3E+02
123-91-1	1,4-Dioxane	---	---	---	4.0E+01	1.7E+02	---	6.1E+00
122-39-4	Diphenylamine	---	---	---	1.6E+03	1.7E+04	---	9.1E+02
298-04-4	Disulfoton	---	---	---	2.6E+00	2.7E+01	---	1.5E+00
115-29-7	Endosulfan (mixture)	470	---	1.80E+01	---	4.1E+03	---	2.2E+02
959-98-8	Endosulfan I ^d	---	---	---	---	---	---	---
33213-65-9	Endosulfan II ^d	---	---	---	---	---	---	---
1031-07-8	Endosulfan sulfate	---	---	---	---	---	---	---
72-20-8	Endrin	23	---	1	NA	2.0E+02	2	1.1E+01
7421-93-4	Endrin aldehyde	---	---	---	---	---	---	---
100-41-4	Ethylbenzene	7800	400	13	NA	2.3E+02	700	1.3E+03
97-63-2	Ethyl methacrylate	---	---	---	1.4E+02	1.4E+02	---	5.5E+02
62-50-0	Ethyl methanesulfonate	---	---	---	---	---	---	---
52-85-7	Famphur	---	---	---	---	---	---	---
206-44-0	Fluoranthene	3100	---	4300	NA	2.7E+04	---	1.5E+03
86-73-7	Fluorene	3100	---	560	NA	9.0E+01	---	2.4E+02
76-44-8	Heptachlor	0.1	4	23	NA	4.2E-01	0.4	1.5E-02
1024-57-3	Heptachlor epoxide	0.07	5	0.7	NA	2.1E-01	0.2	7.4E-03
118-74-1	Hexachlorobenzene	0.4	1	2	NA	1.2E+00	1	4.2E-02

See text for source references. "—" = value is not currently available. "NA" = value is not applicable for this constituent refer to the SSL values given in the columns labeled "Ingestion", "Inhalation" and "Protection of GW."

TABLE OF RISK-BASED SCREENING LEVELS

May, 1998

CAS No.	Constituent	Soil Screening Level (mg/kg)					GW Screening Level (ug/L)	
		Ingestion	Inhalation	Protection of GW ^a	Region 9 PRG		MCL	R9 PRG ^b
					Residential	Industrial		
87-68-3	Hexachlorobutadiene	8	8	2	NA	2.4E+01	---	8.6E-01
77-47-4	Hexachlorocyclopentadiene	550	10	400	NA	4.6E+03	50	2.6E+02
67-72-1	Hexachloroethane	46	55	0.5	NA	1.4E+02	---	4.8E+00
70-30-4	Hexachlorophene	---	---	---	2.0E+01	2.0E+02	---	1.1E+01
1888-71-7	Hexachloropropene	---	---	---	---	---	---	---
591-78-6	2-Hexanone	---	---	---	---	---	---	---
193-39-5	Indeno(1,2,3-cd)pyrene	0.9	---	14	NA	2.6E+00	---	9.2E-02
78-83-1	Isobutyl alcohol	---	---	---	1.1E+04	1.0E+05	---	1.8E+03
465-73-6	Isodrin	---	---	---	---	---	---	---
78-59-1	Isophorone	670	4600	0.5	NA	2.0E+03	---	7.1E+01
120-58-1	Isosafrole	---	---	---	---	---	---	---
143-50-0	Kepone	---	---	---	2.5E-02	1.1E-01	---	3.7E-03
7439-92-1	Lead	400	---	---	NA	4.0E+02	---	4.0E+00
7439-97-6	Mercury (total)	23	10	2	NA	5.1E+02	---	1.1E+01
126-98-7	Methacrylonitrile	---	---	---	2.0E+00	8.1E+00	---	1.0E+00
91-80-5	Methapyrilene	---	---	---	---	---	---	---
72-43-5	Methoxychlor	390	---	160	NA	3.4E+03	40	1.8E+02
74-83-9	Methyl bromide; Bromomethane	110	10	0.2	NA	2.3E+01	---	8.7E+00
74-87-3	Methyl chloride; Chloromethane	---	---	---	1.2E+00	2.6E+00	---	1.5E+00
56-49-5	3-Methylcholanthrene	---	---	---	---	---	---	---
74-95-3	Methylene bromide; Dibromomethane	---	---	---	6.5E+02	6.8E+03	---	3.7E+02
75-09-2	Methylene chloride; Dichloromethane	85	13	0.02	NA	1.8E+01	---	4.3E+00
78-93-3	Methyl ethyl ketone; MEK	---	---	---	7.1E+03	2.7E+04	---	1.9E+03
74-88-4	Methyl iodide; Iodomethane	---	---	---	---	---	---	---
80-62-6	Methyl methacrylate	---	---	---	7.6E+02	2.8E+03	---	4.9E+02
66-27-3	Methyl methanesulfonate	---	---	---	---	---	---	---
91-57-6	2-Methylnaphthalene	---	---	---	---	---	---	---
298-00-0	Methyl parathion; Parathion methyl	---	---	---	1.6E+01	1.7E+02	---	9.1E+00
108-10-1	4-Methyl-2-pentanone; Methyl isobutyl ketone	---	---	---	7.7E+02	2.8E+03	---	1.6E+02

See text for source references. "—" = value is not currently available. "NA" = value is not applicable for this constituent refer to the SSL values given in the columns labeled "Ingestion", "Inhalation" and "Protection of GW."

TABLE OF RISK-BASED SCREENING LEVELS

May, 1998

CAS No.	Constituent	Soil Screening Level (mg/kg)					GW Screening Level (ug/L)	
		Ingestion	Inhalation	Protection of GW ^a	Region 9 PRG		MCL	R9 PRG ^b
					Residential	Industrial		
91-20-3	Naphthalene	3100	---	84	NA	2.4E+02	---	2.4E+02
130-15-4	1,4-Naphthoquinone	---	---	---	---	---	---	---
134-32-7	1-Naphthylamine	---	---	---	---	---	---	---
91-59-8	2-Naphthylamine	---	---	---	---	---	---	---
7440-02-0	Nickel	1600	13000	130	NA	3.4E+04	---	7.3E+02
88-74-4	o-Nitroaniline	---	---	---	3.9E+00	4.1E+01	---	2.2E+00
99-09-2	m-Nitroaniline	---	---	---	---	---	---	---
100-01-6	p-Nitroaniline	---	---	---	---	---	---	---
98-95-3	Nitrobenzene	39	92	0.1	NA	9.4E+01	---	3.4E+00
88-75-5	o-Nitrophenol	---	---	---	---	---	---	---
100-02-7	p-Nitrophenol	---	---	---	---	---	---	---
56-57-5	4-Nitroquinoline 1-oxide	---	---	---	---	---	---	---
924-16-3	N-Nitrosodi-n-butylamine	---	---	---	2.2E-02	5.5E-02	---	2.0E-03
55-18-5	N-Nitrosodiethylamine	---	---	---	3.0E-03	1.3E-02	---	4.5E-04
62-75-9	N-Nitrosodimethylamine	---	---	---	8.7E-03	3.7E-02	---	1.3E-03
86-30-6	N-Nitrosodiphenylamine	130	---	1	NA	3.9E+02	---	1.4E+01
621-64-7	N-Nitrosodipropylamine; Di-n-	0.09	---	0.00005	NA	2.7E-01	---	9.6E-03
10595-95-6	N-Nitrosomethylethylamine	---	---	---	2.0E-02	8.7E-02	---	3.1E-03
59-89-2	N-Nitrosomorpholine	---	---	---	---	---	---	---
100-75-4	N-Nitrosopiperidine	---	---	---	---	---	---	---
930-55-2	N-Nitrosopyrrolidine	---	---	---	2.1E-01	9.1E-01	---	3.2E-02
99-55-8	5-Nitro-o-toluidine	---	---	---	1.3E+01	5.8E+01	---	2.0E+00
56-38-2	Parathion	---	---	---	3.9E+02	4.1E+03	---	2.2E+02
1336-36-3	Polychlorinated biphenyls; PCBs	1	---	---	NA	3.4E-01	---	8.7E-03
See Note c)	Polychlorinated dibenzo-p-dioxins; PCDDs	---	---	---	---	---	---	---
See Note c)	Polychlorinated dibenzofurans; PCDFs	---	---	---	---	---	---	---
608-93-5	Pentachlorobenzene	---	---	---	5.2E+01	5.5E+02	---	2.9E+01
76-01-7	Pentachloroethane	---	---	---	---	---	---	---
82-68-8	Pentachloronitrobenzene	---	---	---	1.7E+00	7.3E+00	---	2.6E-01
87-86-5	Pentachlorophenol	3	---	0.03	NA	7.9E+00	---	5.6E-01

See text for source references. "—" = value is not currently available. "NA" = value is not applicable for this constituent; refer to the SSL values given in the columns labeled "Ingestion", "Inhalation" and "Protection of GW."

TABLE OF RISK-BASED SCREENING LEVELS

May, 1998

CAS No.	Constituent	Soil Screening Level (mg/kg)					GW Screening Level (ug/L)	
		Ingestion	Inhalation	Protection of GW ^a	Region 9 PRG		MCL	R9 PRG ^b
					Residential	Industrial		
62-44-2	Phenacetin	---	---	---	---	---	---	---
85-01-8	Phenanthrene	---	---	---	---	---	---	---
108-95-2	Phenol	47000	---	100	NA	1.0E+05	---	2.2E+04
106-50-3	p-Phenylenediamine	---	---	---	1.2E+04	1.0E+05	---	6.9E+03
298-02-2	Phorate	---	---	---	1.3E+01	1.4E+02	---	7.3E+00
109-06-8	2-Picoline	---	---	---	---	---	---	---
23950-58-5	Pronamide	---	---	---	4.9E+03	5.1E+04	---	2.7E+03
107-12-0	Propionitrile; Ethyl cyanide	---	---	---	---	---	---	---
129-00-0	Pyrene	2300	---	4200	NA	1.0E+02	---	1.8E+02
110-86-1	Pyridine	---	---	---	6.5E+01	6.8E+02	---	3.7E+01
94-59-7	Safrole	---	---	---	---	---	---	---
7782-49-2	Selenium	390	---	5	NA	8.5E+03	50	1.8E+02
7440-22-4	Silver	390	---	34	NA	8.5E+03	---	1.8E+02
93-72-1	Silvex; 2,4,5-TP	---	---	---	5.2E+02	5.5E+03	50	2.9E+02
100-42-5	Styrene	16000	1500	4	NA	6.8E+02	---	1.6E+03
18496-25-8	Sulfide	---	---	---	---	---	---	---
93-76-5	2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	---	---	---	6.5E+02	6.8E+03	---	3.7E+02
1746-01-6	2,3,7,8-TCDD; 2,3,7,8-Tetrachlorodibenzo-p-dioxin	---	---	---	3.8E-06	2.4E-05	---	4.5E-07
95-94-3	1,2,4,5-Tetrachlorobenzene	---	---	---	2.0E+01	2.0E+02	---	1.1E+01
630-20-6	1,1,1,2-Tetrachloroethane	---	---	---	2.4E+00	5.4E+00	---	4.3E-01
79-34-5	1,1,2,2-Tetrachloroethane	3	0.6	0.003	NA	1.1E+00	---	5.5E-02
127-18-4	Tetrachloroethylene; Perchloroethylene; Tetrachloroethene	12	11	0.06	NA	1.7E+01	5	1.1E+00
58-90-2	2,3,4,6-Tetrachlorophenol	---	---	---	2.0E+03	2.0E+04	---	1.1E+03
3689-24-5	Tetraethyl dithiopyrophosphate	---	---	---	2.0E+03	2.0E+04	---	1.1E+03
7440-28-0	Thallium (total)	---	---	0.7	5.4E+00	1.2E+02	2	---
7440-31-5	Tin	---	---	---	4.6E+04	1.0E+05	---	2.2E+04
108-88-3	Toluene	16000	650	12	NA	8.8E+02	1000	7.2E+02
95-53-4	o-Toluidine	---	---	---	---	---	---	---

See text for source references. "—" = value is not currently available. "NA" = value is not applicable for this constituent refer to the SSL values given in the columns labeled "Ingestion", "Inhalation" and "Protection of GW."

TABLE OF RISK-BASED SCREENING LEVELS

May, 1998

CAS No.	Constituent	Soil Screening Level (mg/kg)					GW Screening Level (ug/L)	
		Ingestion	Inhalation	Protection of GW ^a	Region 9 PRG		MCL	R9 PRG ^b
					Residential	Industrial		
8001-35-2	Toxaphene	0.6	89	31	NA	1.7E+00	3	6.1E-02
120-82-1	1,2,4-Trichlorobenzene	780	3200	5	NA	5.5E+03	70	1.9E+02
71-55-6	1,1,1-Trichloroethane;	---	1200	2	NA	3.0E+03	200	7.9E+02
79-00-5	1,1,2-Trichloroethane	11	1	0.02	NA	1.5E+00	5	2.0E-01
79-01-6	Trichloroethylene; Trichloroethene	58	5	0.06	NA	7.0E+00	5	1.6E+00
75-69-4	Trichlorofluoromethane	---	---	---	3.8E+02	1.3E+03	---	1.3E+03
95-95-4	2,4,5-Trichlorophenol	7800	---	270	NA	6.8E+04	---	3.7E+03
88-06-2	2,4,6-Trichlorophenol	58	200	0.2	NA	1.7E+02	---	6.1E+00
96-18-4	1,2,3-Trichloropropane	---	---	---	1.4E-03	3.1E-03	---	1.6E-03
126-68-1	O,O,O-Triethyl phosphorothioate	---	---	---	---	---	---	---
99-35-4	sym-Trinitrobenzene	---	---	---	3.3E+00	3.4E+01	---	1.8E+00
7440-62-2	Vanadium	550	---	6000	NA	1.2E+04	---	2.6E+02
108-05-4	Vinyl acetate	78000	1000	170	NA	2.6E+03	---	4.1E+02
75-01-4	Vinyl chloride	0.3	0.03	0.01	NA	3.5E-02	2	2.0E-02
108-38-3	m-Xylene	160000	420	210	NA	3.2E+02	---	1.4E+03
95-47-6	o-Xylene	160000	410	190	NA	3.2E+02	---	1.4E+03
106-42-3	p-Xylene	160000	460	200	NA	3.2E+02	---	---
1330-20-7	Xylene (total)	160000	410	190	NA	3.2E+02	10000	1.4E+03
7440-66-6	Zinc	23000	---	12000	NA	1.0E+05	---	1.1E+04

a) Migration to groundwater with a dilution attenuation factor of 20. It should be noted that at sites where little or no dilution or attenuation of soil leachate concentrations would be expected between the source and a nearby receptor, a DAF of 20 may not be conservative enough. This situation may apply at sites with shallow water tables, fractured media, karst topography, or source size greater than 30 acres. For such situations, the *Technical Background Document* should be consulted to determine migration to ground water SSLs based on a DAF = 1 (no dilution). Alternatively, a site-specific DAF may be developed using the methodology given in the *Technical Background Document*.

b) Region 9 PRG "Tap Water" value.

c) Note: If the PCDDs and/or PCDFs are suspected as potential constituents of concern, then the analysis must be conducted to identify and quantify the mixture of toxic PCDD/PCDF congeners. The results of congener analysis should be used to calculate a Toxic Equivalent (TEQ) concentration for the mixture. The TEQ concentration should be compared to the RBSLs for 2,3,7,8-TCDD. Please refer to the document: "Estimating Exposure to Dioxin-Like Compounds; Volume II: Properties, Sources, Occurrence and Background Exposures" (EPA/600/6-88/005Cb; June 1994).

d) For this constituent, refer to the values listed under corresponding mixture of isomers.

See text for source references. "—" = value is not currently available. "NA" = value is not applicable for this constituent; refer to the SSL values given in the columns labeled "Ingestion", "Inhalation" and "Protection of GW."

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AMERICAN HOME PRODUCTS CORPORATION

ONE CAMPUS DRIVE, PARSIPPANY, NEW JERSEY 07054, (973) 683-2000

30 August 2000

ENVIRONMENT & SAFETY

Mr. Kenneth Bardo
Project Manager
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

RE: EKCO-Massillon, OH
USEPA Comments Letter (Aug/04/00)
Telephone Discussion and Clarifications (Aug/24/00)

Dear Mr. Bardo:

This letter is to document our recent telephone discussion of Thursday Aug/24/00 with regards to my inquiry to seek clarification pertaining to certain issues communicated by the USEPA in their letter to EKCO of August/04/00. As I indicated, AHPC was surprised to receive a directive to recalculate the soil clean-up goals in the proposed Statement-of-Basis (SB dated April/1996), and to add two additional chemical parameters (i.e., Perchloroethylene and Vinyl Chloride).

As you discussed, the EPA's rationale for this work scope approach includes the following:

The current soil screening goals documented in the approved final Corrective Measures Study (CMS dated Nov/1993) and presented in the proposed SB, appear to be approximately an order of magnitude higher than the USEPA Soil Screening Levels (SSL's), which were subsequently promulgated in 1996. Utilizing the SSL calculation to obtain a revised soil clean-up goal for each parameter, as part of the proposed soil sampling program, is requested by the USEPA. AHPC should anticipate that the calculated SSL's would be adopted for the final SB.

The soil screening parameters listed in the CMS include: TCE, 1,2-DCE, 1,1,-DCE, and 1,1,1-TCA. The USEPA has requested that PCE and VC be included as two additional parameters since they were initially present in the groundwater at concentrations above their respective MCL's, as determined by the RCRA Facility Investigation (RFI) and documented in the CMS (Section 5.3.1.4).

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RE: EKCO-Massillon, OH

USEPA Comments Letter (Aug/04/00)

Telephone Discussion and Clarifications (Aug/24/00)

At this time AHPC is requesting that the two additional parameters (PCE and VC) not be adopted for screening, for the following reasons:

- 1) The on-going voluntary groundwater monitoring program performed monthly for the two deep pumping wells (W-1 & W-10) and semi-annually for the shallow aquifer and bedrock wells (R-1, R-2, R-3, L-4, & L-5) show no concentrations of perchlorethylene above MCL's.
- 2) Because natural attenuation is occurring at the site, vinyl chloride concentrations are expected in the groundwater; however, 13 years of monitoring have shown it to be very limited.
- 3) We believe that the approved CMS alternative for groundwater remediation (e.g., GW-6) is appropriately corrective for the evaluated groundwater concentrations, and
- 4) Soil sampling results obtained during the RFI program do not indicate the presence of PCE and/or VC at any sampled depth.

Again, we would ask at this time that PCE and VC parameters not be adopted for the soil sample program and/or for the final Statement-of-Basis. EKCO will use the USEPA calculated SSL's as requested by the EPA, but is not waiving its right to contest the applicability of these levels to the site at a later date.

AHPC appreciates the 2-week extension period you have granted for initiating the proposed soil sampling program, as well as the opportunity to provide this letter of request for clarification.

Sincerely yours



Matthew Basso

Manager, Environmental Affairs

American Home Products Corporation

Cc: G. Smith – AHPC
K. Koneval – AHPC
B. Kaufman – Hale & Dorr

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Roy F. Weston, Inc.
1400 Weston Way
P.O. Box 2653
West Chester, Pennsylvania 19380
610-701-3000 • Fax 610-701-3186
www.rfweston.com

6 September 2000

Mr. Kenneth Bardo
Project Manager
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: EKCO, Massillon, Ohio
Response to USEPA Comments Letter, 4 August 2000

Dear Mr. Bardo:

On behalf of our client, American Home Products Corporation (AHPC), please find attached a response to all of your comments outlined in your QAPP Approval Letter, dated 4 August 2000. The following attachments are enclosed with this letter:

- Attachment 1—Copy of 4 August 2000 Cover Letter and Comments
- Attachment 2—Responses to USEPA Comments
- Attachment 3—Revised Soil Boring Location Map
- Attachment 4—Revised Soil Cleanup Goals
- Attachment 5—Revised QAPP Addendum with Requested SOPs
- Attachment 6—Corrected Table 4-1 from 1999 Groundwater Monitoring Report

I would like to reiterate AHPC's request included in Matt Basso's letter, dated 31 August 2000, that the two additional parameters, tetrachloroethene (PCE) and vinyl chloride (VC), not be adopted for the soil sample program and/or for the final Statement of Basis. EKCO does currently plan to use the USEPA calculated SSL's as requested by the EPA, but is not waiving its right to contest the applicability of these levels to the site at a later date. We appreciate the 2-week extension granted for initiating the proposed soil sampling program. We are currently planning to start the soil sampling program the week of 18 September 2000, pending approval of the attached response to comments.

You may contact me at (610) 701-7360 or Mr. Matthew Basso at (973) 683-2273, if you have any questions or comments regarding this submittal.

Very truly yours,

ROY F. WESTON, INC.

Thomas Cornuet, P.G.
Project Manager

Attachments

cc: M. Basso, AHPC (w/attachments)
G. Smith, AHPC (w/attachments)
R. Springer, Borden (w/attachments)
L. Bove, WESTON (w/o attachments)



**RESPONSE TO COMMENTS RECEIVED FROM EPA
ON 4 AUGUST 2000**

**ATTACHMENT 1
Copy Of 4 August 2000 Cover Letter and Comments**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

August 4, 2000

REPLY TO THE ATTENTION OF:

DE-9J

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Jeffrey Burman
EKCO Housewares, Inc.
359 State Avenue, Ext. N.W.
P.O. Box 560
Massillon, Ohio 44648-0560

RE: QAPP Approval with Modifications
EKCO Housewares, Inc.
OHD 045 205 424

Dear Mr. Burman:

The United States Environmental Protection Agency (U.S. EPA) has completed a review of the June 30, 2000 submittal from Roy F. Weston, Inc. for the EKCO facility in Massillon, Ohio. The submittal included recovery well mass removal calculations, a Geoprobe Soil Sampling Quality Assurance Project Plan (QAPP) Addendum, and the 1999 Groundwater Monitoring Report.

The main purpose of the June 30, 2000 submittal was to present a soil sampling program capable of determining the current concentrations of contaminants in on-site soils. EKCO believes that in the nine years that have passed since the last soil sampling event, contaminant concentrations may have significantly decreased which may result in the reduction and/or elimination of proposed soil remediation areas. However, if contaminant concentrations are still found to exceed appropriate soil cleanup levels in these areas, U.S. EPA's proposed remedy of soil vapor extraction (SVE) will be required to protect human health and the environment.

U.S. EPA approves the June 30, 2000 submittal with the enclosed modifications. The soil sampling described in the submittal, as modified by U.S. EPA, is expected to be performed in August 2000, concurrent with the modified groundwater sampling program.

If you have any questions regarding the enclosed modifications,
please contact me at (312) 886-7566.

Sincerely yours,

Kenneth S. Bardo

Kenneth S. Bardo
Corrective Action Section

Enclosures (3)

cc: Matthew Basso, American Home Products Corporation
C. Richard Springer, Borden, Inc.
Thomas Cornuet, Roy F. Weston, Inc.
Karen Nesbit, Ohio EPA

ENCLOSURE 1

Geoprobe Soil Sampling Quality Assurance Project Plan (QAPP) Addendum

1) Based on soils data presented in the November 1993 Final CMS Report, significant concentration of VOCs were found in four areas as depicted in Figure 2-6 of the Final CMS Report. A review of soils data presented in Figures 2-1 through 2-5 of the Final CMS report generally shows significant detectable concentrations of VOCs at the following locations:

West side of building - SB-10 (1988) and SB-11 (1988);
Southwest corner of building - SB-06 (1991), SB-07 (1991),
and SB-13 (1988);
Northeast corner under building - SB-09 (1991), SB-10
(1991), and SB-11 (1991): and
North side of building - SB-06 (1988), SB-07 (1988), and
SB-08 (1988).

In addition, U.S. EPA notes that detectable concentrations of VOCs were typically found at SB-04 (1991) and SB-09 (1988) located to the east of the northeast corner of the building.

Since January 1, 1998, the U.S. EPA, Region 5 Corrective Action program has required SW-846, Update III methods for determining VOCs in soils (see Enclosure 2). The purpose of the Update III method is to minimize VOC volatilization and biodegradation. Past sampling procedures and methods, including those used at the EKCO facility, are believed to have resulted in underestimating the total VOCs actually present.

In order to ensure that all potential areas of soil contamination are addressed and risks properly assessed during the proposed Geoprobe soil sampling program, U.S. EPA requires that areas identified above be accurately characterized using EPA SW-846, Update III methods. Accordingly, modify Figure 1 showing the 12 proposed soil boring locations to include six additional sample locations at SB-07 (1991), at SB-10 (1988), between SB-09 (1991) and SB-10 (1991), at SB-08 (1988), at SB-04 (1991) and at SB-09 (1988).

2) Soil cleanup goals are calculated and provided in Appendix B of the Final CMS Report. For those VOCs to be analyzed during the proposed Geoprobe soil sampling program, the facility soil cleanup goals provided in the Final CMS Report are:

<u>VOC</u>	<u>Soil Cleanup Goal</u>
1,1-DCE	0.7 mg/kg
1,2-DCE	9.6 mg/kg
1,1,1-TCA	49.5 mg/kg
TCE	1.0 mg/kg
PCE	-
Vinyl Chloride	-

Soil cleanup goals are not presented for PCE or vinyl chloride. Determine the soil cleanup goals for these two VOCs prior to sampling.

3) U.S. EPA conducted an analysis of the facility soil cleanup goals presented in Appendix B of the Final CMS Report compared to generic soil screening levels (SSLs) for migration to groundwater found in the *Soil Screening Guidance: Technical Background Report* (EPA/540/R-95/128, May 1996). The analysis shows that the facility soil cleanup goal concentrations are at least an order of magnitude greater than the SSLs using a dilution attenuation factor of 20 (for example, TCE concentrations of 1.0 mg/kg versus 0.06 mg/kg and 1,2-DCE concentrations of 9.6 mg/kg versus 0.7 mg/kg). The soil cleanup goal concentrations are also at least an order of magnitude higher than the corresponding EPA Region 5 Risk-Based Screening Levels (see Enclosure 3).

The EPA soil screening guidance model uses a simple linear equilibrium soil/water partition to estimate contaminant release in soil leachate and a simple water-balance equation to calculate a dilution factor to account for reduction of soil leachate from mixing in an aquifer. The method used in the Final CMS Report to calculate the facility soil cleanup goals is the Summers Model (EPA/540/2-89/057).

U.S. EPA needs assurances that the facility-specific soil cleanup goals meet current guidelines for protecting groundwater. Compare and discuss the differences in the two models. Update the facility soil cleanup goals for the VOC analyte list provided in Element 9 of the QAPP Addendum by using the SSL calculation methods provided in the soil screening guidance. Use these updated facility soil cleanup goals in the reassessment of soil remediation.

4) A schedule for undertaking soil sampling and submitting the final soil sampling report described in Element 6 of the QAPP Addendum is not included. The soil sampling program must be initiated no later than September 1, 2000. The report is due to U.S. EPA within 45 days of receipt of all analytical results.

5) Specific procedures for collecting, handling, and preserving soil samples for VOC analysis in accordance with Method 5035 are not included in the QAPP Addendum. EKCO must provide a field sampling SOP to U.S. EPA for review and approval that outlines the specific procedures to be used in accordance with Method 5035 (e.g., EnCore® sampling, type of preservation, field check for effervescence when preserving with sodium bisulfate) prior to sampling. EKCO must also ensure that the on-site BL Analytical lab and/or the off-site Aqua Tech Environmental Laboratories are capable of collecting and analyzing soil samples using Method 5035 in conjunction with Method 8260B (including low and high level analysis). Provide the laboratory SOP for purge and trap for VOCs by Method 5035/Method 8260B prior to sampling. It is important that the sampling team coordinate with the laboratory so that valid data is generated.

6) Proper QA/QC to be implemented during the Geoprobe soil sampling program must include: one set of trip blank samples for each sample cooler containing samples; one set of equipment blank samples each day for non-dedicated sampling devices; field duplicate samples to be collected at a rate of 1 for every 10 samples to be analyzed; and MS/MSD pairs to be collected at a rate of 1 for every 20 samples.

7) Page 3 of Element 6 of the QAPP Addendum proposes field screening prior to sampling. It is important that field screening with the TVA does not allow the open soil core to be exposed to the atmosphere for any significant length of time. In order to minimize volatilization, samples for laboratory analysis must be immediately taken upon opening of the sample tubes and placed on ice. Screening samples from the same zone can be taken at that time and placed in clean glass VOA vials or polyethylene bags. Upon screening with the TVA, preserved soil samples from the zone to be analyzed can be sent to the laboratory. Provide a field SOP for TVA screening to U.S. EPA for review and approval prior to sampling.

1999 Groundwater Monitoring Report

1) The groundwater elevations presented in Table 4-1 bear no resemblance to the groundwater elevations portrayed in Figures 4-1 through 4-6. Confirm the data and modify the table and/or figures accordingly.

2) In Figure 4-6, the groundwater contours in the vicinity of R-2, R-4, and R-10 are not accurate provided that the groundwater elevations shown are correct. Groundwater would be expected to

flow from R-2 toward R-10, whereas the contours show groundwater flow from R-10 toward R-2.

3) Figures 4-7 through 4-10 provide graphs that are used to better evaluate the data for potential increasing or decreasing trends. As a result, EKCO concludes that five of the eight wells being monitored exhibit a decreasing trend, two wells exhibit no trend, and one well exhibits an increasing to decreasing to stable trend.

Conclusions regarding any trends must be supported by a statistical analysis. Conduct a statistical analysis for each contaminant of concern at each well to confirm these observed trends (e.g., Mann-Kendall trend analysis). A statistical analysis will provide a more conclusive determination of the effectiveness of the ongoing groundwater remediation system.

**RESPONSE TO COMMENTS RECEIVED FROM EPA
ON 4 AUGUST 2000**

**ATTACHMENT 2
Comment Responses**

Attachment 2

Response to Comments Received from the EPA on 4 August 2000

Geoprobe Soil Sampling Quality Assurance Project Plan (QAPP) Addendum

Response to Comment No. 1: The six additional Geoprobe soil boring locations requested by the EPA will be included in the proposed effort. A revised Figure 1, which shows the 6 new soil boring locations, is included as **Attachment 3**.

Response to Comment No. 2: As indicated in Matt Basso's letter to the EPA, dated 30 August 2000, we request that the two additional compounds, tetrachloroethene (PCE) and vinyl chloride (VC), not be added to the soil sampling program and/or the Final Statement of Basis. This request is based on the following:

1. The ongoing voluntary groundwater monitoring program performed monthly for the two deep pumping wells (W-1 and W-10) and semi-annually for the shallow aquifer and bedrock wells (R-1, R-2, R-3, L-4, and L-5) shows no concentrations of PCE above MCL's.
2. Because natural attenuation is occurring at the site, VC concentrations are expected in the groundwater; however, 13 years of monitoring have shown it to be very limited.
3. We believe that the approved CMS alternative for groundwater remediation (e.g., GW-6) is appropriately corrective for the evaluated groundwater concentrations, and
4. Soil sampling results obtained during the RFI program do not indicate the presence of PCE and/or VC at any sampled depth.

Response to Comment No. 3: Soil cleanup goals were recalculated using the newer method presented in the Soil Screening Guidance (EPA, April 1996). The recalculated soil cleanup goals are included in **Attachment 4**. However, EKCO does not waive the right to contest the applicability of the recalculated soil cleanup goals to the site at a future time.

Response to Comment No. 4: The planned schedule for undertaking the soil sampling and reporting is shown below:

Soil Boring Activities	18-22 September 2000
Laboratory Data Completed	6 November 2000
Deliver Report to EPA	8 December 2000

If any unforeseen delays affect this schedule, the EPA will be notified promptly.

Response to Comment No. 5: Specific procedures for collecting, handling, and preserving soil samples for VOC analysis in accordance with Method 5035 have been added to the QAPP Addendum as a separate SOP. A separate laboratory SOP for purge and trap for VOCs by Method 5035/Method 8260B was also added to the QAPP Addendum. The revised QAPP Addendum is included in **Attachment 5**.

Response to Comment No. 6: The soil sampling effort will include the QA/QC sampling requested by the EPA, as follows:

- One set of trip blank samples for each sample cooler containing samples.
- One set of equipment blank samples each day for any non-dedicated sampling devices.
- An MS/MSD pair to be collected at a rate of 1 for every 20 samples.
- Field duplicate samples to be collected at rate of 1 for every 10 samples to be analyzed.

It is important to note that, due to soil heterogeneities, soil VOC duplicate samples often produce significant variations in concentration.

Response to Comment No. 7: Specific procedures for field TVA screening have been included as a separate SOP in the revised QAPP Addendum. The revised QAPP Addendum is included in **Attachment 5**.

Draft 1999 Groundwater Monitoring Report

Response to Comment No. 1: The groundwater elevation data presented in Table 1 in the Draft Report are incorrect. The previous year's data were inadvertently included in the 1999 Report. Table 1 will be corrected in the Final Report. A corrected copy of Table 1 is included as **Attachment 6**. The water level data presented on Figures 4-1 through 4-6 are correct in the current report.

Response to Comment No. 2: The existing contour map does not show groundwater flowing from R-10 toward R-2 as indicated in the comment. The map contours do indicate that groundwater is flowing from R-4 northward toward R-2 and R-10 as the data reflect. However, the groundwater contours in the area surrounding wells R-2, R-4, and R-10 will be re-evaluated to be sure that they accurately reflect the measured field data in the Final Report.

Response to Comment No. 3: The discussion in the Groundwater Monitoring Report regarding Figures 4-7 through 4-10 was not intended to be a definitive statistical trend analysis. They were simply intended to show, in general, that concentrations have decreased in several wells. The text will be revised for the Final Report to more accurately represent their purpose. A statistical analysis such as the Mann-Kendall trend analysis will be provided for any definitive statistical trend analyses done in the future.

**RESPONSE TO COMMENTS RECEIVED FROM EPA
ON 4 AUGUST 2000**

**ATTACHMENT 3
Revised Soil Boring Location Map**

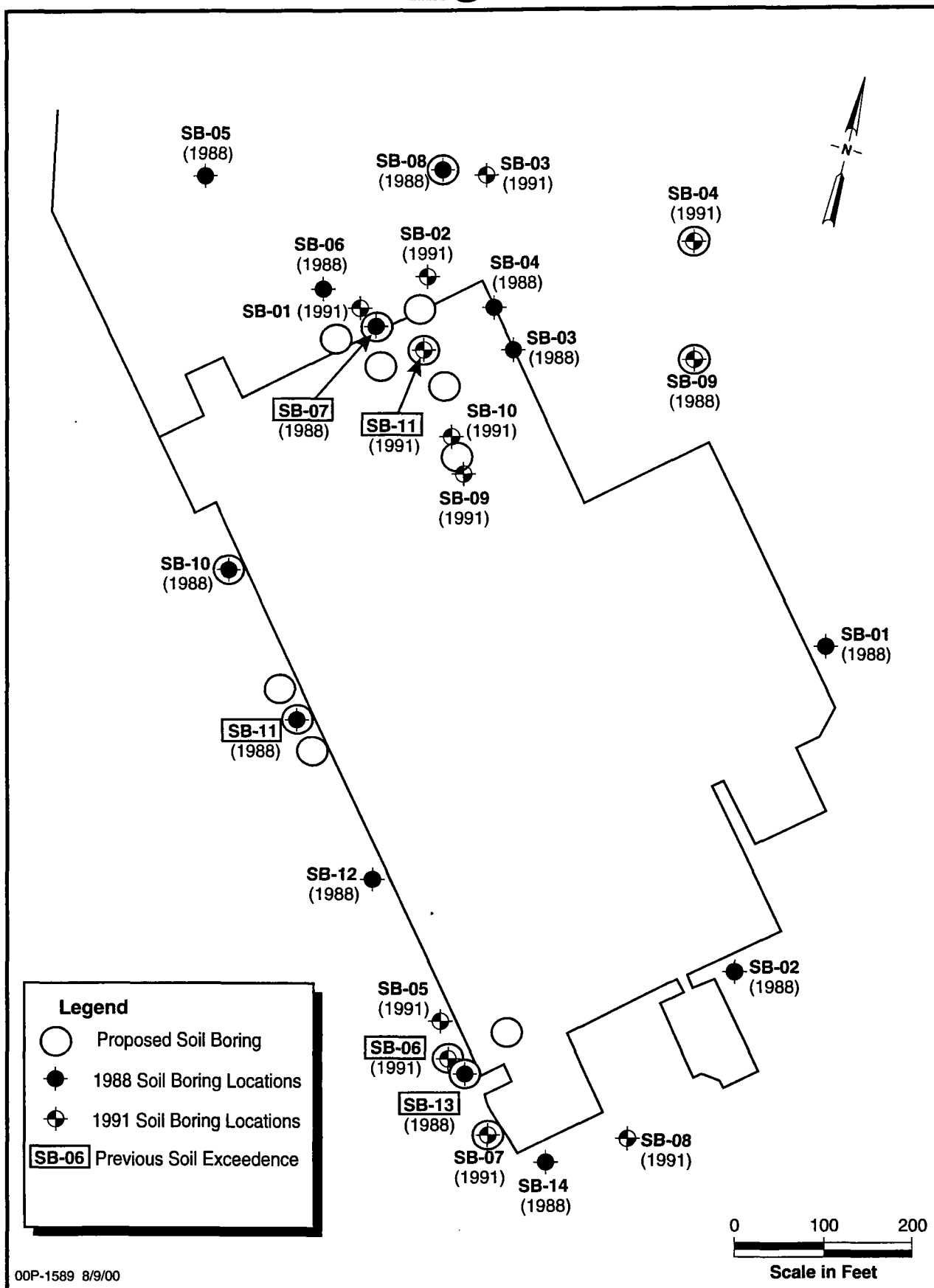


FIGURE 1 PREVIOUS AND PROPOSED SOIL BORING LOCATIONS

**RESPONSE TO COMMENTS RECEIVED FROM EPA
ON 4 AUGUST 2000**

**ATTACHMENT 4
Revised Soil Cleanup Goals**

Attachment 4
Responses to Comments from the EPA on 4 August 2000
Revised Soil Cleanup Goals

Soil cleanup goals for site-related contaminants were presented in Appendix B of the Final Corrective Measures Study (CMS) Report (WESTON, November 1993). These goals were calculated using the "Summers Model" (EPA, October 1989). In a letter dated 4 August 2000, the EPA requested that site soil cleanup goals be re-calculated using a newer calculation, which is presented in the *Soil Screening Guidance: User's Guide* (EPA, April 1996). The EPA also requested that a discussion be provided comparing the two different soil cleanup calculations. The requested soil cleanup goal discussion, and the re-calculated soil cleanup goals are included below.

Contaminant Soil/Water Partitioning

There is a direct relationship between the amount of contaminant sorbed onto a soil matrix (C_s) and the concentration of the contaminant in the water (C_w). When the equilibrium soil and water concentrations are plotted, the slope of that line is referred to as the equilibrium or distribution coefficient (K_d). The process by which a contaminant becomes distributed between the soil and water phase is referred to as partitioning. When the relationship is linear, it can be described by the following equation (Fetter, 1992):

$$K_d = \frac{C_s}{C_w}$$

Where:

K_d = the distribution coefficient (L/Kg)

C_s = the mass of solute sorbed per dry unit weight of solid (mg/Kg)

C_w = the concentration of solute in solution, in equilibrium with the mass of solute sorbed onto the solid (mg/L)

The distribution coefficient (K_d) can be estimated using the estimated soil fraction of organic carbon (f_{oc}) and a published organic carbon partition coefficient (K_{oc}) value. The distribution coefficient (K_d) is essentially a quantitative measure of the buffering capacity of a soil for a particular contaminant. A relatively high distribution coefficient indicates a soil has a relatively high buffering capacity and high contaminant retardation factor. Conversely, a relatively low distribution coefficient indicates a soil has a relatively low buffering capacity and high contaminant retardation factor.

Soil Cleanup Goal Calculations

Soil cleanup goals were calculated using two methods, the Summers Model (EPA, October 1989) and the Soil Screening Level (SSL) Guidance (EPA, April 1996). Both calculations typically provide similar results and both are based on the soil/water distribution coefficient (K_d) described above. One difference between the two calculations is the newer SSL calculation accounts for potential partitioning of contaminants from the water phase to the air phase in the vadose zone pore space. This portion of the calculation uses a water partitioning coefficient referred to as Henry's Law Constant (H') and results in a slightly higher calculated soil cleanup goal than would be calculated using the Summers Model, provided all other variables are the same. One other difference is the way in which the dilution is estimated. The Summers Model requires that the amount of dilution be included in the calculation based on the site infiltration rate, groundwater gradient, hydraulic conductivity, and plume dimensions. The SSL calculation provides an option of either using a default dilution factor (i.e., 10 or 20) or calculating a site-specific dilution factor based on site parameters. The results of the Summers Model soil cleanup goal calculations are summarized in Table 1.

The methods used to calculate the SSL soil cleanup goals are in accordance with, and are described fully in, the *EPA Soil Screening Guidance: User's Guide* (EPA, 1996). This method, and the results of these calculations, are described briefly in the following text, tables, and equations. The EPA SSL guidance and the Summers Model are both based on the premise that rainwater infiltrates into unsaturated, contaminated soil, and migrates vertically downward toward an underlying groundwater resource. The equations are designed to estimate conservatively the unsaturated zone soil concentration, which is low enough to adequately protect the quality of the underlying groundwater.

The SSL guidance uses the simple linear contaminant soil/water partitioning relationship described above, and a water-balance equation to calculate a dilution factor. The partitioning relationship accounts for the contaminant soil/water interactions, and the dilution factor accounts for the reduction of soil leachate concentration from mixing with the underlying groundwater. These calculations are based on the following conservative, simplified assumptions concerning the release and transport of contaminants to groundwater (EPA, 1996, Exhibit 12):

- An infinite source (i.e., steady-state concentrations are maintained over the exposure period).
- Soil contamination is distributed uniformly from the ground surface to the water table.
- No contaminant attenuation (i.e., adsorption, biodegradation, chemical degradation) in soil.
- Instantaneous and linear equilibrium soil/water partitioning.
- Unconfined, unconsolidated aquifer with homogenous and isotropic hydrologic properties.

- Receptor well located at the downgradient edge of the source and screened within the plume.
- No contaminant attenuation in the aquifer.
- No NAPLS present (if NAPLS are present, the SSL calculations do not apply).

The main equation used for calculating the SSL soil cleanup goals is shown in Equation 1.

Equation 1 (from EPA, 1996, page 29, Equation 10)

$$SSL(mg / kg) = Cw \left[Kd + \frac{(\theta_w + \theta_a \cdot H')}{Pb} \right]$$

Where:

SSL	=	Soil Screening Level (mg/kg).
Cw	=	Target soil leachate concentration (mg/L).
DF	=	Dilution Factor (unitless).
MCL	=	Maximum Contaminant Level (mg/L).
Kd	=	Distribution coefficient (L/Kg).
θ_w	=	Water filled soil porosity (unitless).
θ_a	=	Air filled soil porosity (unitless).
n	=	Total soil porosity (unitless).
H'	=	Henry's Law Constant (unitless).
Pb	=	Dry soil bulk density (Kg/L).

This equation relates the concentrations of soil contamination to soil leachate contamination within the unsaturated zone of contamination. It calculates an SSL corresponding to a target soil leachate concentration (Cw). The target soil leachate concentration is calculated by multiplying a target groundwater concentration (typically an MCL) by a dilution factor (DF). The dilution factor is calculated using estimated aquifer parameters and Equation 2.

Equation 2 (from EPA, 1996, page 31, Equation 11)

$$DF = 1 + \frac{Kid}{IL}$$

Where:

DF	=	Dilution Factor (unitless).
K	=	Aquifer hydraulic conductivity (ft/yr).
i	=	Hydraulic gradient (ft/ft).
d	=	Mixing zone depth (ft).
I	=	Infiltration rate (ft/yr).
L	=	Source length parallel to groundwater flow (ft).

The dilution factor calculation (Equation 2) is also based on an estimated mixing zone depth in the aquifer immediately beneath the unsaturated zone soil contamination. The estimated mixing zone depth is calculated using Equation 3.

Equation 3 (from EPA, 1996, page 31, Equation 12)

$$d = (0.0112 L^2)^{0.5} + da (1 - \exp[(-LI) / (Ki da)])$$

Where:

d	=	Mixing zone depth (ft).
L	=	Source length parallel to groundwater flow (ft).
I	=	Infiltration rate (ft/yr).
K	=	Aquifer hydraulic conductivity (ft/yr).
i	=	Hydraulic gradient (ft/ft).
da	=	Aquifer thickness (ft).

The SSL calculation also requires a water filled soil porosity value, which is estimated using site parameters and Equation 4.

Equation 4 (from EPA, 1996, Attachment A, page A-5)

$$\theta_w = n (I/K_s)^{1/(2b+3)}$$

Where:

θ_w	=	Water filled soil porosity (unitless).
n	=	Total soil porosity (unitless).
Ps	=	Soil particle density (Kg/L).
Pb	=	Dry soil bulk density (Kg/L).
I	=	Infiltration rate (ft/yr).
Ks	=	Saturated hydraulic conductivity (ft/yr).
1/(2b+3)	=	Soil specific exponential term (unitless).

The input parameters used for calculating the SSL soil cleanup level (Equation 1) are shown in Table 1. This table also shows the calculated SSL soil cleanup level for each VOC of concern at the site. As requested by the EPA, the soil cleanup goals using the newer SSL method will be used for evaluating site soil remediation efforts.

Table 1*
Soil Cleanup Goals
(µg/Kg)

Contaminant	Original Summers Model (11/93)	Calculated New SSLs (08/00)
1,1-DCE	700	120
1,2-DCE	9,600	1,500
1,1,1-TCA	49,500	6,140
TCE	1,000	230

SSL Calculation Contaminant Parameters

Contaminant	MCL⁽¹⁾ (mg/L)	KOC⁽²⁾ (mL/g)	H⁽³⁾
1,1-DCE	0.007	589	1.07
1,2-DCE	0.1	525	0.385
1,1,1-TCA	0.2	110	0.705
TCE	0.005	166	0.422

(1) Maximum Contaminant Level (USEPA, 2000)

(2) Soil Organic Carbon-Water Partition Coefficients (USEPA, 1996)

(3) Henry's Law Constants (USEPA, 1996)

SSL Calculation Aquifer Parameters

Porosity (n) = 0.15 (unitless).

Dry Bulk Density Pb = 1.9 (kg/L).

Hydraulic Conductivity = 1 (ft/day).

Hydraulic Gradient = 0.071 (ft/ft).

*EKCO does not waive its right to later contest the applicability of calculated new SSL's to this site.

**RESPONSE TO COMMENTS RECEIVED FROM EPA
ON 4 AUGUST 2000**

**ATTACHMENT 5
Revised QAPP Addendum**

**Geoprobe™ Sampling Quality Assurance
Project Plan (QAPP) Addendum**

for the

Quality Assurance Management Plan (September 1988)

for the

**EKCO Housewares, Inc. Facility in
Massillon, Ohio
U.S. EPA ID #OHD 045 205 424**

Prepared by

**Roy F. Weston, Inc.
1400 Weston Way
West Chester PA 19380**

September 2000

W.O. No. 02994.002.006

Prepared for

**American Home Products Corporation
One Campus Drive
Parsippany, NJ 07054**

**QAPP ADDENDUM ELEMENT 1
TITLE/SIGNATURE PAGE**

**GEOPROBETTM SAMPLING QUALITY ASSURANCE
PROJECT PLAN (QAPP) ADDENDUM
for the
QUALITY ASSURANCE MANAGEMENT PLAN (SEPTEMBER 1988)
for the
EKCO HOUSEWARES, INC. FACILITY IN
MASSILLON, OHIO
U.S. EPA ID NUMBER OHD 045 205 424**

SEPTEMBER 2000

**Prepared by:
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**Prepared for:
American Home Products Corporation
One Campus Drive
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Matthew Basso – AHPC Project Manager

Date

Thomas Cornuet – WESTON Project Manager

Date

Laurence Bove – WESTON Program Manager/QA Officer

Date

Victoria White – AquaTech Laboratories QA Manager

Date

Kenneth Bardo – U.S. EPA RCRA Project Manager

Date

– U.S. EPA RCRA Enforcement/Permitting
QA Coordinator

Date

**QAPP ADDENDUM
ELEMENT 6
SAMPLING PROCEDURES**

The sampling procedures to be used in this focused site investigation are limited to Geoprobe® soil boring sample collection at selected areas discussed herein. The Geoprobe soil boring sampling scope of work and sample collection procedures are described below.

Geoprobe Soil Sampling Scope of Work

This scope of work is in response to discussions with AHPC regarding additional soil sampling and other site-related activities at a meeting on 29 February 2000 with AHPC, WESTON, the US EPA, Ohio EPA, EKCO, and BORDEN. The purpose of this sampling effort is to assess current source area soil conditions in order to evaluate soil remedial approaches and associated cost estimates. It is anticipated that data from this study will help to target the soil remediation system currently proposed in the Draft Statement of Basis (SB) issued in September 1996.

Based on the February meeting with the AHPC and EKCO project teams, it was determined that additional soil boring sampling of potential remediation areas was necessary to both confirm and delineate the targeted areas. These additional data will be used to better delineate the horizontal and vertical extent of soil impacted by trichloroethene (TCE) and 1,2-dichloroethene (DCE) concentrations in areas that initially exceeded site cleanup goals based on samples collected in 1988 and 1991 during the RCRA Feasibility Investigation (RFI). The previous RFI TCE and DCE soil sampling results are attached (RFI Figures 2-1 and 2-4). The new data generated by the Geoprobe sampling will also be used to evaluate whether VOC concentrations have decreased in the 9 to 12 years that have elapsed since the original soil samples were collected. There are four areas proposed for soil vapor extraction (SVE) remediation in the Draft SB. Two areas are located at the western edge of the property at SB-06 (1991), SB-13 (1988), and SB-011 (1988), and two areas are located at the northern end of the production building at SB-07 (1988) and SB-11 (1991). All four of these areas are currently delineated by only one or two borings at each location. The additional data will assist in delineating the areas targeted for SVE remediation and determining if soil remediation is still required. This will assist in providing the project team with an understanding of degradation at the site.

Eighteen additional soil borings are proposed to supplement the existing data. These 18 locations include the additional 6 locations requested by EPA in a letter dated 4 August 2000. The proposed locations for the new soil borings are shown in Figure 1. If these initial 18 borings encounter concentrations above the site cleanup goals, additional borings may be required to complete the delineation. The borings will be completed using a Geoprobe rig to refusal or the water table, which varies in depth from approximately 6 to 16 feet below ground surface (bgs) in the target areas. Approximately two to four soil samples will be collected from each boring for analysis of VOCs. This addendum to the original Quality Assurance Management Plan is provided to address the sample collection procedures and analytical methods used for this effort.

A new Quality Assurance Project Plan (QAPP) will be prepared and submitted for EPA review and approval prior to implementing the Final SB remedial activities.

Prior to mobilizing to the field, a preliminary 3-dimensional (3D) model will be developed using the historical soil VOC data. The 3D model will be developed using earthVision[®] software, which is a specialized geologic and environmental modeling tool used in the environmental and oil and gas industries. The field screening results from the soil samples collected on the first day will be used to determine if any of the remaining sample locations should be revised to better delineate the horizontal and vertical extent of the VOC constituents that exceed the site cleanup goals. It is anticipated that the total Geoprobe effort will require approximately 3 to 4 days in the field, including mobilization and demobilization. A final soil sampling report will be provided which includes photographs taken of the soil boring locations, soil classification logs, laboratory data reports, and TCE and DCE concentration maps. In addition, we will have developed a geologic and contaminant profile that can be used to determine soil volumes for the areas requiring remediation.

As requested by the U.S. EPA at the February meeting, the samples will be collected and analyzed using U.S. EPA Method 5035. See attached Standard Operating Procedures (SOPs) for additional details on sample collection and TVA screening.

Geoprobe Soil Sampling Procedures

The Geoprobe sampling procedure is described below.

- Prior to conducting any site activities the project field team will review and agree to follow the site HASP.
- Prior to any intrusive subsurface sampling, the soil boring sampling locations will be marked and the locations will be cleared for utilities by the EKCO site contact, Jeff Burman.
- Each soil sampling location will be photographed prior to drilling activities commence.
- Each soil sampling location will be located either by GPS or measurements from known fixtures such as buildings or monitor wells.
- Soil samples will be collected using a Geoprobe direct-push sampling device. The Geoprobe will be used to push (or hammer) acetate-lined, low carbon steel sample tubes into the subsurface to bedrock refusal, the water table, or 12 feet, whichever is encountered first.
- After retrieval of the sample tubes, the acetate liners will be cut open and the sample will be immediately scanned with a Thermal Vapor Analyzer (TVA) as a preliminary assessment of organic compounds in the soil.
- Approximately two to four samples will be immediately collected from each soil boring location for analysis of a six VOCs (TCE, 1,2-DCE, 1,1-DCE, and 1,1,1-TCA). The

samples for VOC analysis will be collected from intervals that appear the most likely to be contaminated based on the TVA screening and other observations such as staining.

- The VOC soil samples will be collected and analyzed following US EPA SW-846 method 5035. After collection, the samples will be shipped to a fixed laboratory (Aquatech Laboratories) for analysis of the six target VOC compounds.
- The following sample identification code will be used:
 - SB-01-2.7-00,
 - where the first two digit number is the boring number beginning at 01,
 - the second two digit number is the depth below ground surface in feet,
 - and the third two digit number represents the sample year (i.e. 00 for year 2000).
- Each VOC sample will be labeled with the following information:
 - Sample identification code
 - Collection date and time
 - Analysis (select VOCs)
- After selected samples are collected for VOC analysis, a description of the entire soil sample interval will be performed. This description will include the following information:
 - TVA screening results
 - Sample identification codes for VOC samples collected
 - Lithologic description

**QAPP ADDENDUM
ELEMENT 9
ANALYTICAL PROCEDURES**

Soil samples collected during field sampling activities for the EKCO investigation will be analyzed by Aqua Tech Environmental Laboratories, 1776 Marion-Waldo Rd. Marion, OH 43301, (740)389-5991.

The laboratory named above will implement the project required SOPs. These laboratory SOPs (attached) for sample preparation and analysis are based on SW-846 3rd Edition Final Update III, Revised May 1997. These SOPs provide sufficient details and are specific to this investigation. Table 1 summarizes the analyte group of interest and the appropriate U.S. EPA reference method for the organic analytes to be evaluated in this investigation.

Table 1

Analyte Group	Matrix	Preparation Method	Analysis Method
<u>Short List VOCs</u>	Soil	SW5035	SW8260B

Tables 2 shows the reporting levels for the five chlorinated hydrocarbon analytes of interest.

Table 2

VOC Analyte	CAS No.	Reporting Limit (µg/kg)
1,1,1-Trichloroethane	71-55-6	10.0
1,1-Dichloroethene	75-35-4	10.0
cis-1,2-Dichloroethene	156-59-2	10.0
trans-1,2-Dichloroethene	156-60-5	10.0
Trichloroethene (TCE)	79-01-6	10.0

Table 3 below includes a QC section that addresses the minimum QC requirements for the analysis of VOC analytes in soil.

Table 3 – VOCs in Soil QC Limits

Analyte	MS/MSD %Recovery	MS/MSD %RPD	Surrogate %Recovery
1,1,1-Trichloroethane	65-135	20	NA
Trichloroethene (TCE)	64-132	20	NA
Tetrachloroethene (PCE)	60-136	20	NA
Toluene-d8	NA	NA	8-120
Bromofluorobenzene	NA	NA	80-120
1,2-Dichloroethane-d4	NA	NA	80-120

NA – Not Applicable

Table 4 below shows the QA/QC sampling that will be implemented during the Geoprobe soil sampling program.

Table 4 – QA/QC Sampling

Trip Blanks	One set for each sample cooler
Equipment Blanks	One set for each day on soil core acetate liner
Field Duplicate Samples	One set for every 10 samples
MS/MSD	One set for every 20 samples

Attachment 5
Response to Comments Received from the EPA on 4 August 2000

**Field Standard Operating Procedures (SOP) for
Thermal Vapor Analyzer (TVA) Screening**

1. The 4-ft sample core will be laid on a flat surface immediately after retrieval from the subsurface.
2. The sealed acetate liner will be quickly cut across the entire length of the core without disturbing the sample.
3. In order to insure that the sample is collected from the most highly contaminated interval from each core, a calibrated Thermal Vapor Analyzer (TVA) will be used to quickly scan the entire length of the sample core. The location(s) of the most highly contaminated soil will be noted.
4. A visual scan of the soil core will also be performed during the preliminary TVA scan. Sample locations may also be selected based on soil staining observed during the visual scan.
5. Collection of samples for laboratory analysis will begin within approximately two minutes of initially cutting the sealed acetate liner.
6. Three soil samples will be collected from each selected sample interval using an Encore (or equivalent) sampler.
7. Each soil sample will be immediately labeled and placed in a cooler filled with ice. Samples will be kept cool at approximately 4 degrees centigrade from collection until delivery to the fixed laboratory.
8. A more thorough TVA scan may be conducted on the soil core after the soil intervals selected for laboratory analysis have been sampled and placed in a cooler with ice.
9. The TVA screening data will be used to inform the laboratory of samples suspected of containing relatively high levels of VOCs.

Attachment 5
Response to Comments Received from the EPA on 4 August 2000

Geoprobe Field Sampling Standard Operating Procedures (SOP)

EKCO Method 5035 Geoprobe Sampling Procedures

1. Prior to conducting any site activities the project field team will review and agree to follow the site HASP.
2. Prior to any intrusive subsurface sampling, the soil boring sampling locations will be marked and the locations will be cleared for utilities by the EKCO site contact, Jeff Burman.
3. Each soil sampling location will be photographed prior to drilling activities commence.
4. Each soil sampling location will be located either by GPS or measurements from known fixtures such as buildings or monitor wells.
5. Soil samples will be collected using a Geoprobe direct-push sampling device. The Geoprobe will be used to push (or hammer) acetate-lined, low carbon steel sample tubes into the subsurface to bedrock refusal, the water table, or 12 feet, whichever is encountered first.
6. After retrieval of the sample tubes, the acetate liners will be cut open and the sample will be immediately scanned with a Thermal Vapor Analyzer (TVA) as a preliminary assessment of organic compounds in the soil. See the attached Field TVA Screening SOP for more details on TVA screening.
7. Approximately two to four samples will be immediately collected from each soil boring location for analysis of four VOCs (TCE, 1,2-DCE, 1,1-DCE, and 1,1,1-TCA). The samples for VOC analysis will be collected from intervals that appear the most likely to be contaminated based on the TVA screening and other observations such as staining.
8. The VOC soil samples will be collected and analyzed following US EPA SW-846 method 5035. Encore samplers (or equivalent) will be used to collect the samples. Three samples will be collected from each location.
9. The samples will be continuously preserved on ice while in the field and will be transported to the fixed laboratory daily, and laboratory analysis will begin within 2 days of sample collection therefore, no methanol or sodium bisulfate preservative will be used in the field. No field check for effervescence will be done due to the absence of sodium bisulfate in the samplers.
10. After collection, the samples will be shipped to a fixed laboratory (Aquatech Laboratories) for analysis of the six target VOC compounds. See attached Laboratory SOP for detailed laboratory analysis procedures.
11. The following sample identification code will be used:

- SB-01-2.7-00,
- where the first two digit number is the boring number beginning at 01,
- the second two digit number is the depth below ground surface in feet,
- and the third two digit number represents the sample year (i.e. 00 for year 2000).

12. Each VOC sample will be labeled with the following information:

- Sample identification code
- Collection date and time
- Analysis (select VOCs)

13. After selected samples are collected for VOC analysis, a description of the entire soil sample interval will be performed. This description will include the following information:

- TVA screening results
- Sample identification codes for VOC samples collected
- Lithologic description

General Geoprobe Sampling Procedures

General Procedure

A Geoprobe® is a hydraulically-powered drilling machine that utilizes both pressure and percussion to advance sampling and logging tools into the subsurface. Geoprobe® rigs can be used to perform soil core and soil gas sampling, groundwater sampling, soil conductivity and contaminant logging, grouting, and materials injection.

When used to collect soil samples, the assembled soil sampler is attached to the leading end of a probe rod and driven into the subsurface using a Geoprobe® soil probing machine. Additional probe rods are connected in succession to advance the sampler to depth. Depending on the type of sampler used, the sampler may be used as an open-tube or closed-piston sampler.

The simplest and most common use of the sampler is as an open-tube sampler. In this method, coring starts at the ground surface with an open-ended sampler. From the ground surface, the sampler is advanced one sampling interval and then retrieved from the hole with the first soil core. In stable soil, the open-tube sampler is inserted back down the same hole to obtain the next core. Operators have reported coring to depths well exceeding 30 feet (9 m) with this method.

In unstable soil, which tends to collapse into the core hole, the sampler can be equipped with a piston assembly. This assembly locks into the cutting shoe and prevents soil from entering the sampler as it is advanced to the bottom of an existing hole.

The closed-piston sampler is not designed to be driven through undisturbed soil containing gravel, asphalt, coarse sand, or rubble. In this case, the soil should be removed down to the sampling depth using an open-tube sampler, or a pilot hole may be

drilled. The closed-piston sampler is then installed and the sampler is inserted or driven back down the same hole. When the leading end of the sampler reaches the top of the next sampling interval, the piston is unlocked using extension rods inserted down the inside of the probe rods.

Soil samples are collected within a liner. A liner is a removable/replaceable, thin-walled tube inserted inside the sample tube for the purpose of containing and storing soil samples. Liner materials include stainless steel, brass, PTFE (polytetrafluoroethylene or Teflon®), PVC (polyvinyl chloride), CAB (cellulose acetate butyrate), and PETG (polyethylene terephthalate glycol).

General Considerations

1. Make sure that the driller has at least three or four samplers. This allows the collection of several samples before stopping to clean and decontaminate the equipment.
2. A collapsible table or stand is handy to hold decontaminated sampler tubes and liners. Equipment must be protected from contamination by placing it on a sheet of plastic on the ground.
3. Ensure that all soil is removed from inside the sample tube. Sand particles can bind liners in the sampler. Full liners are difficult to remove under such conditions. In extreme cases the soil sample must be removed from the liner before it can be freed from the sample tube.
4. Information about the subsurface and depth to bedrock should be known before driving the sampler. Damage may occur if the sampler is driven into rock or other impenetrable material. The pilot hole should be made only to a depth above the sampling interval.

Open-Tube Sampling

A representative soil sample is obtained by driving the sampler one sampling interval from ground surface into undisturbed soil. Upon retrieving the sampler, the liner and soil core are removed. The sampler is then properly decontaminated, reassembled with a new liner, and inserted back down the same hole until the top of the next sampling interval is reached. The tool string is then driven to the depth of the subsequent continuous sampling interval.

Non-cohesive soils will often collapse to the bottom of the hole. This slough material then enters the sampler as the next soil core is collected, resulting in a non-representative sample. A closed-piston sampler should be used under such conditions.

Closed-Piston Sampling

It is often difficult to collect representative soil cores from significant depths with an open-tube sampler due to soil slough. Because of this, the sampler can be equipped with

a piston that locks into the cutting shoe. This allows the sealed sampler to pass through the slough material and be opened at the appropriate sampling interval.

The assembled sampler is connected to the leading end of a probe rod and driven into the subsurface. Additional probe rods are connected in succession to advance the sampler to depth. The sampler remains sealed (closed) by a piston tip as it is being driven. The piston is held in place by a stop-pin at the trailing end of the sampler. When the sampler tip has reached the top of the desired sampling interval, a series of extension rods, sufficient to reach depth, are coupled together and lowered down the inside diameter of the probe rods. After the extension rods and stop-pin have been removed, the tool string is advanced the depth of the sampling interval. The piston is displaced inside the sampler body by the soil as the sample is collected. To recover the sample, the sampler is retrieved from the hole and the liner containing the soil sample is removed. Do not allow the driller to over-drive the sampler.

Soil Core Recovery

The soil sample is removed from the sampler by unscrewing the cutting shoe and pulling out the liner. Depending upon the sampling protocols, the soil sample may either be preserved within the liner or removed from the liner and placed in sample jars.

If soil samples are to be collected from the liner, undisturbed samples can be obtained from Teflon, PVC, and PETG liners by splitting the liner. Clear plastic liners and Teflon® liners can be slit open with a hooked-blade utility knife or other device and the samples to be analyzed placed in appropriate containers. A manual extruder may be used to push the soil cores out of metal liner sections for transfer to other containers.

If the samples are to be preserved in the liner, the soil sample should be secured by placing a vinyl (or other appropriate material) end cap on each end of the liner. If the sample is to be segmented, the liner should be cut around the outside circumference. Metal liners come with plastic cladding on the outside of the liner to keep four 6-inch sections aligned. Remove the cladding and cut the sections apart with a knife. With brass, stainless steel, and Teflon® liners, cover the end of the sample tube with Teflon® tape before placing the end caps on the liner. The tape should be smoothed out and pressed over the end of the soil core so as to minimize headspace. However, care should be taken not to stretch and therefore thin the tape. Develop a system such as a black end cap is always placed at the bottom (down end) of the sample core and a red end cap is placed at the top (up end) of the core. Color-coding the ends of the liner will help to quickly identify the top and bottom of the sample during later analysis.

Decontamination

Before and after each use, thoroughly clean all parts of the soil sampling system according to project requirements (See SOP C.8). A new, clean liner is required for each use if using PETG, PVC, or Teflon liners.

Thoroughly clean the sampler before assembly, not only to remove contaminants but also to ensure correct operation. Dirty threads complicate assembly and may lead to sampler failure. Sand is particularly troublesome because it can bind liners in the sample tube resulting in wasted time and lost samples.

Field Blank

A field blank may be required to be taken on a representative sample liner prior to starting a project and at regular intervals. Liners can become contaminated in storage. A field blank will prove that the liners do not carry contaminants which can be transferred to soil samples. However, a field blank will probably not be required when sampling for only PCBs.

If a field blank is required, it may be taken as follows:

1. Place an end cap or other appropriate device on one end of the liner.
2. Pour distilled water (or other suitable extracting fluid) into the liner.
3. Place an end cap on the open end of the liner.
4. From the vertical position, repeatedly invert the liner so that the distilled water contacts the entire inner surface. Repeat this step for one minute.
5. Remove one end cap from the liner, empty contents into an appropriate sample container, and cap the container.
6. Perform analysis on the extract water for the analytes of interest to the investigation.

STANDARD OPERATING PROCEDURE

PURGEABLE ORGANICS BY GAS CHROMATOGRAPHY/ MASS SPECTROMETRY METHOD 8260A/8260B

1.0 SCOPE AND APPLICATION

This method covers the determination of volatile organic compounds in water, soils, oils and other matrices. The following analytes are determined by this method, however, additional analytes may be determined by this method.

Table 1.

TARGET ANALYTE	CAS NUMBER	MIN. R.L. (WATER,UG/L)	MIN. R.L. (SOIL,MG/KG)
Acetone	67-64-1	20	0.100
Allyl chloride	107-05-1	10	0.050
Benzene	71-43-2	1	0.005
Bromochloromethane	74-97-5	1	0.005
Bromodichloromethane	75-27-4	1	0.005
Bromoform	75-25-2	1	0.005
Bromomethane	174-83-9	1	0.010
Carbon Disulfide	75-15-0	5	0.005
Carbon Tetrachloride	56-23-5	1	0.005
Chlorobenzene	108-90-7	1	0.005
Chloroethane	75-00-3	1	0.010
Chloroform	67-66-3	0.5	0.005
Chloromethane	74-87-3	1	0.010
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	1	0.005
Dibromochloromethane	124-48-1	1	0.005
1,2-Dibromoethane (EDB)	106-93-4	1	0.005
Dibromomethane	74-95-3	1	0.005
1,2-Dichlorobenzene	95-50-1	1	0.005
1,3-Dichlorobenzene	541-73-1	1	0.005
1,4-Dichlorobenzene	106-46-7	1	0.005
trans-1,4-Dichloro-2-butene	110-57-6	50	0.100
Dichlorodifluoromethane	75-71-8	1	0.010

1,1-Dichloroethane	75-34-3	0.5	0.005
1,2-Dichloroethane	107-06-2	0.5	0.005
1,1-Dichloroethene	75-35-4	0.5	0.005
cis-1,2-Dichloroethene	156-59-2	0.5	0.005
trans-1,2-Dichloroethene	156-60-5	0.5	0.005
1,2-Dichloropropane	78-87-5	1	0.005
cis-1,3-Dichloropropene	10061-01-5	1	0.005
trans-1,3-Dichloropropene	10061-02-6	1	0.005
Ethyl Benzene	100-41-4	1	0.005
Ethyl methacrylate	97-63-2	10	0.050
2-Hexanone	591-78-6	10	0.050
Methyl ethyl ketone	78-93-3	10	0.050
Methyl iodide	74-88-4	10	0.050
4-Methyl-2-pentanone(MIBK)	108-10-1	20	0.100
Methylene Chloride	75-09-2	1	0.005
Styrene	100-42-5	1	0.005
1,1,1,2-Tetrachloroethane	630-20-6	1	0.005
1,1,2,2-Tetrachloroethane	79-34-5	1	0.005
Tetrachloroethene	127-18-4	1	0.005
Toluene	108-88-3	1	0.005
1,1,1-Trichloroethane	71-55-6	1	0.005
1,1,2-Trichloroethane	79-00-5	1	0.005
Trichloroethene	79-01-6	1	0.005
Trichlorofluoromethane	75-69-4	10	0.050
1,2,3-Trichloropropane	96-18-4	1	0.005
Vinyl Acetate	108-05-4	10	0.050
Vinyl Chloride	75-01-4	1	0.005
Xylene, Total		2	0.010

2.0 SUMMARY OF METHOD

An inert gas is bubbled through a 25 ml water sample or a 5 g. soil sample contained in a specially designed purging chamber at 45° C. The purgeables are efficiently transferred from the sample matrix phase to the vapor phase. The vapor is swept to a sorbent trap where the purgeables are trapped. After purging is completed, the trap is heated and backflushed with the inert gas to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected with a mass spectrometer.

3.0 DEFINITIONS

INTERNAL STANDARD -- A pure analyte(s) added to a solution in known amount(s) and used to measure the relative responses of other method analytes and surrogates that are components of the same solution. The internal standard must be an analyte that is not a sample component.

SURROGATE ANALYTE -- A pure analyte(s), which is extremely unlikely to be found in any sample, and which is added to a same aliquot in known amount(s) before extraction and is measured with the sample procedures used to measure other sample components. The purpose of a surrogate analyte is to monitor method performance with each sample.

LABORATORY DUPLICATES (LD1 AND LD2) -- Two sample aliquots taken in the analytical laboratory and analyzed separately with identical procedures. Analyses of LD1 and LD2 give a measure of the precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures.

FIELD DUPLICATES (FD1 AND FD2) -- Two separate samples collected at the same time and placed under identical circumstances and treated exactly the same throughout the field and laboratory procedures. Analyses of FD1 and FD2 give a measure of the precision associated with sample collection, preservation and storage, as well as with laboratory procedures.

LABORATORY REAGENT BLANK (LRB) -- An aliquot of reagent water that is treated exactly as a sample including exposure to all glassware equipment solvents, reagents, internal standards, and surrogates that are used with other samples. The LRB is used to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

FIELD REAGENT BLANK (FRB) -- Reagent water placed in a sample container in the laboratory and treated as a sample in all respects, including exposure to sampling site conditions, storage, preservation, and all analytical procedures. The purpose of the FRB is to determine if method analytes or other interferences are present in the field environment.

LABORATORY PERFORMANCE CHECK SOLUTION (LPC) -- A solution of method analytes, surrogate compounds, and internal standards used to evaluate the performance of the instrument system with respect to a defined set of method criteria. This solution includes external calibration verification solutions such as a Reference Standard and ERA samples.

LABORATORY FORTIFIED BLANK (LFB) -- An aliquot of reagent water to which known quantities of the method analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements at the required method detection limit. Also known as a Calibration Check Standard, and System Performance Check Standard.

LABORATORY FORTIFIED SAMPLE MATRIX (LFM) -- An aliquot of an environmental sample to which known quantities of the method analytes are added in the laboratory. The LFM is analyzed exactly like a sample, and its purpose is to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate aliquot and the measured values in the LFM corrected for background concentrations. Also known as Matrix Spike/Matrix Spike Duplicate.

STOCK STANDARD SOLUTION -- A concentrated solution containing a single certified standard that is a method analyte, or a concentrated solution of a single analyte prepared in the laboratory with an assayed reference compound. Stock standard solutions are used to prepare primary dilution standards.

PRIMARY DILUTION STANDARD SOLUTION -- A solution of several analytes prepared in the laboratory from stock standard solutions and diluted as needed to prepare calibration solutions and other needed analyte solutions.

CALIBRATION STANDARD (CAL) -- A solution prepared from the primary dilution standard solutions and stock standard solutions of the internal standards and surrogate analytes. The CAL solutions are used to calibrate the instrument response with respect to analyte concentration.

QUALITY CONTROL SAMPLE (QCS) -- A sample matrix containing method analytes or a solution of method analytes in a water miscible solvent which is used to fortify reagent water or environmental samples. The QCS is obtained from a source external to the laboratory, and is used to check laboratory performance with externally prepared test materials.

4.0 INTERFERENCES

Method interferences may be caused by contaminants in solvents, reagents, glassware, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. All of these materials must be routinely demonstrated to be free from interferences under the conditions of the analysis by running laboratory reagent blanks.

Also, note that all the analytes listed in the scope are mixtures of a variety of organic compounds and therefore, any number of compounds could interfere positively with the results. The extent of matrix interferences will vary considerably from source to source, depending upon the matrix sampled. Further processing of sample extracts may be necessary.

5.0 SAFETY

The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined; however, each chemical should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material safety data sheets should also be made available to all personnel involved in the chemical analysis.

6.0 APPARATUS AND EQUIPMENT

6.1 SAMPLE BOTTLE -- Waters - Borosilicate, 40 ml volume, fitted with screw caps lined with TFE-fluorocarbon. Soils - Borosilicate, 8 ounce, fitted with screw caps lined with TFE-fluorocarbon.

6.2 GLASSWARE

6.2.1 Glass Sample Vessels -- Water samples:

5-ml, 25-ml glassware, suitable for Tekmar 2016/2032, or OI 4560.

6.2.2 Glass Sample Vessels -- Soil samples:

19x150mm Borosilicate Glass Tubes.

6.2.3 Microsyringes -- 5uL, 10 uL, 25 uL, 100 uL, 250 uL, 500 uL, and 1,000 uL. These syringes should be equipped with a 20 gauge (0.006 in. ID) needle having a length sufficient to extend from the sample inlet to within 1 cm of the glass fill in the purging device. The needle length will depend upon the dimensions of the purging device employed.

6.2.4 Syringes -- 5 mL and 25 mL, gas-tight with shutoff valve.
5 ul, 10 ul Hamilton syringes

- 6.2.5 Vortex** -- Used to slurry soil samples and methanolic extracts.
- 6.2.6 Volumetric flasks, Class A** -- 10 mL and 100 mL, with ground glass stoppers.
- 6.2.7 Spatula** -- Stainless steel.
- 6.2.8 Disposable pipets** -- Pasteur.
- 6.3 BALANCE** -- Top Loading, capable of accurately weighing to the nearest 0.01 g.
- 6.4 GAS CHROMATOGRAPH** -- Analytical system complete with temperature programmable GC suitable for use with capillary columns and all required accessories including syringes, analytical columns, gases, detector, and a data system for measuring peak areas. Table 7 lists retention time windows used for the method analytes using the columns and analytical conditions described below.
- 6.4.1 Column** -- 75 m long x 0.53 mm I.D. DB-624 bonded fused silica column, 3.0 μ m film thickness or equivalent. Helium carrier gas flow is established at 10.0 ml/min and oven temperature is programmed at 45°C for 1 minute, 8°C/minutes to 220°C, hold at 220°C for 2 minutes. The injector temperature was 120°C. The jet Separator temperature was 250°C. The Transfer Line Interface temperature was 280°C.
- 6.4.2 Detector** -- Mass Selective Detector(MSD). A MSD was used to generate the validation data presented in this method.
- 6.4.3 Data System** -- HP RTE-A data system.

7.0 REAGENTS & CALIBRATION STANDARDS

- 7.1 Methanol** -- Distilled-in-glass quality or equivalent.
- 7.2 Glass Wool** -- Pyrex 8 micron.
- 7.3 Reagent water** -- Reagent water is defined as a water that is reasonably free of contamination that would prevent the determination of any analyte of interest. A reverse osmosis system is used in the lab.

7.4 Gases -- The helium gas used as a carrier and for purging is 99.999% ultra high purity and halogen free. It is purchased from AGA.

7.5 Standards -- The calibration standards are purchased from Accustandard and Absolute. All aqueous spike standards and matrix spike standards are also purchased from Accustandard and Absolute. Reference standards are purchased either from a different vendor or the same vendor as the calibration standards but from a different lot. These standards are stored at -15°C, and their shelf life is determined per information supplied by the vendor.

7.6 Internal Standard/Surrogate Solutions -- This solution is made from Neat Standards purchased from Chem Serv. It includes the following components at the appropriate concentrations.

Method 8260 Internal Standard/Surrogate Solution(OI & Tekmar)

Step 1. Prepare 1,4-Dichlorobenzene-d₄ Solution by weighing out 250mg into a 5.0ml volumetric flask and adjusting to volume with Methanol. Mix until 1,4-Dichlorobenzene-d₄ dissolves. Concentration is 50mg/ml.

Step 2. To a 1000 ml volumetric flask, containing about 950 ml of methanol add the following listed Chem Service neat solutions. Adjust to volume with methanol. Transfer contents to amber storage bottles. Store in freezer at -15°C for 6 months or until check standards indicate a problem.

<u>Compound</u>	<u>Amount</u>	<u>Conc.</u>
Pentafluorobenzene	26.5 µl	25 ppm
Dibromofluoromethane	10.3 µl	25 ppm
1,4-Difluorobenzene	22.5 µl	25 ppm
Toluene-d ₈	26.5 µl	25 ppm
Chlorobenzene-d ₅	21.5 µl	25 ppm
Bromofluorobenzene	15.5 µl	25 ppm
1,4-Dichlorobenzene-d ₄	1.0ml (See Step 1)	25 ppm

Method 8260 Internal Standard Solution(Soils)

To a 100 ml volumetric flask containing about 90 ml of methanol add the following listed Chem Service neat solutions. Adjust to volume with methanol. Transfer contents to amber storage bottles. Store in freezer at -15°C for 6 months or until check standards indicate a problem.

<u>Compound</u>	<u>Amount</u>	<u>Conc.</u>
Pentafluorobenzene	26.5 µl	25 ppm
1,4-Difluorobenzene	22.5 µl	25 ppm

Chlorobenzene-d5	21.5 µl	25 ppm
1,4-Dichlorobenzene-d4	1.0ml (See Step 1)	25 ppm

Method 8260 Primary Surrogate Solution(Soils)

To a 10 ml volumetric flask containing about 9 ml of methanol add the following listed Chem Service neat solutions. Adjust to volume with methanol. Transfer contents to amber storage bottles. Store in freezer at -15°C for 6 months or until check standards indicate a problem.

<u>Compound</u>	<u>Amount</u>	<u>Conc.</u>
Dibromofluoromethane	10.3 µl	6250 ppm
Toluene-d8	26.5 µl	6250 ppm
Bromofluorobenzene	15.5 µl	6250 ppm

Working Surrogate Solution(Soils)

To a 50ml volumetric flask containing about 45ml of methanol add 200 µl of Primary Surrogate Spiking Solution. Adjust to volume with methanol. Transfer contents to an amber bottle and store in freezer until use. Concentration of this working solution is 25 ppm. Use one ml of this solution added to 9 ml of methanol when doing methanol extracts for high level analysis of soils. (See Section 11.1.2).

7.7 LFB/LFM -- The LFB/LFM solutions are purchased from Accustandard and Absolute and contains all target analytes at 200 µg/ml. This solution is in Methanol and stored at -15°C. These solutions are used for one to 2 months or until a new calibration is generated. The LFB is spiked and analyzed at the same concentration as the Continuing Calibration Check Standard. The LFM (spike/spike duplicate) are spiked at a mid-range level, approximately equal to the concentrations of the analytes found in the unspiked sample.

7.8 GC/MS Tuning Standard -- A 1 µl injection of the Tekmar 8240 Internal Standard/Surrogate Solution at 50 ng/µL is used for the tune check. This solution is stored at -15°C.

8.0 SAMPLE COLLECTION, PRESERVATION AND HANDLING

Grab samples must be collected in glass containers. Conventional sampling practices should be followed, except that the bottle must not be prewashed with sample before collection. Soil samples are collected in either four or 8 ounce unpreserved wide mouth glass jars. The lid is a screw type lined with teflon. Water samples are collected in 40 ml VOA vials and are preserved to a pH of less than 2 with 1:1 hydrochloric acid. When sampling for Method 8260B, see Section 7.0 of the Encore and Archon SOP.

The samples must be iced or refrigerated at 4°C away from light from the time of collection until extraction. Preservation study results indicate that most method analytes present in samples are stable for 14 days for water and 14 days for soils when stored under these conditions.

9.0 CALIBRATION

Establish GC operating parameters equivalent to those indicated in Section 6.4.1. The GC system is calibrated using the internal standard technique.

9.1 INTERNAL STANDARD CALIBRATION PROCEDURE

- 9.1.1 Prior to the analysis of standards, the GC/MS tuning 50ng/uL of BFB must be analyzed. A 50 ng/ul injection of BFB must result in a mass spectrum for BFB which meets the following criteria listed below in Table 2.

Table 2.

BFB KEY IONS AND ION ABUNDANCE CRITERIA

MASS	ION ABUNDANCE CRITERIA
50	15-40% OF MASS 95
75	30-60% OF MASS 95
95	BASE PEAK, 100% REL ABUNDANCE
96	5-9% OF MASS 95
173	<2% OF MASS 174
174	>50% OF MASS 95
175	5-9% OF MASS 174
176	95-101% OF MASS 174

9.1.2a SOILS -- Five different concentrations of volatile standards are used to produce the calibration curve. The concentrations of the volatile compounds are 10, 50, 100, 150 and 200 $\mu\text{g/L}$ or $\mu\text{g/Kg}$ for soils, respectively and internal standard compounds at 50 $\mu\text{g/L}$ throughout. The standard mix is obtained from Accustandard. The first standard (10 $\mu\text{g/L}$) is made by injecting 0.25 μL of standard mix into a 5 ml syringe containing 5 ml of reagent grade water. The second standard (50 $\mu\text{g/L}$) is made by injecting 1.25 μL of standard mix into a 5 ml syringe containing 5 ml of reagent grade water. The third standard (100 $\mu\text{g/L}$) is made by injecting 2.50 μL of standard mix into a 5 ml syringe containing 5 ml of reagent grade water. The fourth standard (150 $\mu\text{g/L}$) is made by injecting 3.75 μL of standard mix into a 5 ml syringe containing 5 ml of reagent grade water. The fifth standard (200 $\mu\text{g/L}$) is made by injecting 5.00 μL of standard mix into a 5 ml syringe containing 5 ml of reagent grade water. To each of these levels 5 μL of internal standard/surrogate solution (250 $\mu\text{g/L}$) is injected.

9.1.2b WATERS -- Five different concentrations of volatile standards are used to produce the calibration curve. The concentrations of volatile compounds are 4, 10, 20, 30, and 40 $\mu\text{g/L}$ respectively and internal standard compounds at 10 $\mu\text{g/ml}$ throughout. The standard mix is obtained from Accustandard. The first standard (4 ppb) is made by injecting 2.0 μL of standard mix into a 100 ml volumetric flask containing reagent grade water. The volumetric is then capped and inverted three times. The neck portion of the flask is discarded and 40 ml of standard is transferred to a 40 ml VOA vial. The second standard (10 ppb) is made by injecting 5.0 μL of standard mix into a 100 ml volumetric flask containing reagent grade water. The volumetric is then capped and inverted three times. The neck portion of the flask is discarded and 40 ml of standard is transferred to a 40 ml VOA vial. The third standard (20 ppb) is made by injecting 10.0 μL of standard mix into a 100 ml volumetric flask containing reagent grade water. The volumetric is then capped and inverted three times. The neck portion of the flask is discarded and 40 ml of standard is transferred to a 40 ml VOA vial. The fourth standard (30 ppb) is made by injecting 15.0 μL of standard mix into a 100 ml volumetric flask containing reagent grade water. The volumetric is then capped and inverted three times. The neck portion of the flask is discarded and 40 ml of standard is transferred to a 40 ml VOA vial. The fifth standard (40 ppb) is made by injecting 20.0 μL of standard mix into a 100 ml volumetric flask containing reagent grade water. The volumetric is then capped and inverted three times. The neck portion of the flask is discarded and 40 ml of standard is transferred to a 40 ml VOA vial. These



vials are then loaded onto the OI 4551 autosampler. The OI 4560 Sim Spiker loads 10 µl of the internal standard/surrogate solution automatically.

- 9.1.3** Tabulate the area response of the characteristic ions (see Table 7) against concentration for each compound and each internal standard. Calculate response factors (RF) for each compound relative to one of the internal standards. The internal standard selected for the calculation of the RF for a compound should be the internal standard that has a retention time closest to the compound being measured. The RF is calculated as follows:

$$RF = (A_x C_{is}) / (A_{is} C_x)$$

where: A_x = Area of the characteristic ion for the compound being measured.
 A_{is} = Area of the characteristic ion for the specific internal standard.
 C_{is} = Concentration of the specific internal standard (µg/L).
 C_x = concentration of the compound being measured (µg/L).

- 9.1.4** The average RF must be calculated for each compound using the 5 RF values calculated for each compound from the initial (5-point) calibration curve. A system performance check should be made before this calibration curve is used. Five compounds (the System Performance Check Compounds, or SPCCs) are checked for a minimum average relative response factor. These compounds and their minimum acceptable average RF are chloromethane 0.1, 1,1-dichloroethane 0.1, bromoform 0.25, 1,1,2,2-tetrachloroethane 0.3, and chlorobenzene 0.3. If the minimum relative response factors are not met, the system must be evaluated, and corrective action must be taken before sample analysis begins. Some possible problems are standard mix degradation caused by contaminated lines or active sites in the system. Examples of these occurrences are:

- 9.1.4a** Chloromethane - This compound is the most likely compound to be lost if the purge flow is too fast.
- 9.1.4b** Bromoform - This compound is one of the compounds most likely to be purged very poorly if the purge flow is too slow. Cold spots and/or active sites in the transfer lines may adversely affect response. Response of the quantitation ion (m/z 173) is directly affected by the tuning of BFB at ions

m/z 174/176. Increasing the m/z 174/176 relative to m/z 95 ratio may improve bromoform response.

- 9.1.4c** Tetrachloroethane and 1,1-dichloroethane - These compounds are degraded by contaminated transfer lines in purge-and-trap systems and/or active sites in trapping materials.
- 9.1.5** Using the RFs from the initial calibration, calculate and record the percent relative standard deviation (%RSD) for all compounds. The percent RSD is calculated as follows:

$$\%RSD = \frac{SD}{RF} \times 100$$

where:

- RSD = relative standard deviation.
RF = mean of 5 initial RFs for a compound.
SD = standard deviation of average RFs for a compound

The percent relative standard deviation should be less than 15% for each compound. However, the %RSD for each individual Calibration Check Compound (CCC) must be less than 30%. Late-eluting compounds usually have much better agreement. The CCCs are:

1,1-Dichloroethene
Chloroform
1,2-Dichloropropane
Toluene
Ethylbenzene
Vinyl Chloride

- 9.1.5a** If the %RSD greater than 30 percent is measured for any CCC, then corrective action to eliminate a system leak and/or column reactive sites is required before reattempting calibration.
- 9.1.6** Linearity - If the % RSD of any compound is 15% or less, then the relative response factor is assumed to be constant over the calibration range, and the average relative response factor may be used for quantitation (Sec. 9.1.5).
- 9.1.6a** If the RSD of any compound is greater than 15%, construct calibration curves of area ration (A/A_{is}) versus concentration using first or higher order regression fit of the five calibration points. The analyst should select the regression order which introduces the least calibration error into the quantitation (Sec. 9.1.5). The correlation coefficient for the curve chosen

must be greater than or equal to 0.995. The use of calibration curves is a recommended alternative to average response factor calibration, and a useful diagnostic of standard preparation accuracy and absorption activity in the chromatographic system.

- 9.1.7 These curves are verified each shift by purging a Calibration Check Standard. Recalibration is required only if calibration and on-going performance criteria cannot be met.

9.2 Daily GC/MS calibration

- 9.2.1 Prior to the analysis of samples, inject or purge 50 ng of the 4-Bromofluorobenzene standard. The resultant mass spectra for the BFB must meet all of the criteria given in Table 2 before sample analysis begins. These criteria must be demonstrated each 12 hour shift.
- 9.2.2 The initial calibration curve (Sec. 9.1.2) for each compound of interest must be checked and verified once every 12 hours of analysis time. This is accomplished by analyzing a calibration standard that is at a concentration near the midpoint concentration for the working range of the GC/MS and checking the System Performance Check Compounds (SPCCs) (Sec. 9.1.4) and Calibration Check Compounds (CCCs) (Sec. 9.1.5).
- 9.2.3 System Performance Check Compounds (SPCCs) - A system performance check must be made each 12 hours. If the SPCCs criteria are met, a comparison of relative response factors is made for all compounds. This is the same check that is applied during the initial calibration. If the minimum relative response factors are not met, the system must be evaluated, and corrective action must be taken before sample analysis begins. The minimum relative response factor for volatile SPCCs are acceptable (See Section 9.1.4). Some possible problems are standard mixture degradation, injection port inlet contamination, contamination at the front end of the analytical column, and active sites in the column or chromatographic system.
- 9.2.4 Calibration Check Compounds (CCCs): After the system performance check is met, CCCs listed in Sec. 9.1.5 are used to check the validity of the initial calibration.

Calculate the percent drift using the following equation:

$$\% \text{ Drift} = \frac{C_i - C_c}{C_c} \times 100$$

C_1

where:

C_1 = Calibration Check Compound standard concentration

C_c = Measured concentration using selected quantitation method.

If the percent difference for each CCC is less than 20%, the initial calibration is assumed to be valid. If the criterion is not met ($> 20\%$ drift), for any one CCC, corrective action must be taken. Problems similar to those listed under SPCCs could affect this criterion. If no source of the problem can be determined after corrective action has been taken, a new five point calibration MUST be generated. This criterion MUST be met before quantitative sample analysis begins. If the CCCs are not required analytes by the permit, then all required analytes must meet the 20% drift criterion.

9.2.5 The internal standard responses and retention times in the check calibration standard must be evaluated immediately after or during data acquisition. If the retention time for any internal standard changes by more than 30 seconds from the last calibration check (12 hours), the chromatographic system must be inspected for malfunctions and corrections must be made, as required. Also, the internal standard areas of all samples analyzed are compared to the areas of the internal standards in the C Cal Standard. If the area for any of the internal standards changes by a factor of two from the last daily calibration check standard, the sample must be reanalyzed.

10.0 QUALITY CONTROL

Minimum quality control (QC) requirements are initial demonstration of laboratory capability, analysis of laboratory reagent blanks, laboratory fortified samples, laboratory fortified blanks, laboratory duplicates, laboratory matrix spikes and matrix spike duplicates, and QC samples.

10.1 Initial Demonstration of Capability

10.1.1 The analyst must make an initial, one-time, demonstration of capability to generate acceptable accuracy and precision with this method. Analyze four 25 ml aliquots of a well mixed QC check sample which contains each analyte at a concentration of 20 ug/L or less, and calculate the average recovery and the standard deviation of each analyte. Compare results with that stated in Tables 3 and 4 (Single Laboratory Accuracy and Precision Data).

10.1.2 For each analyte the recovery value for all four of these samples results are comparable if the calculated standard deviation of the recovery does not exceed 2.6 times the single laboratory RSD or 20%, whichever is greater, and the mean recovery lies within the interval $\bar{x} \pm 3s$ or $\bar{x} \pm 30\%$, whichever is greater. For those compounds that meet the acceptance criteria, performance is considered acceptable. For those compounds that fail these criteria, this procedure must be repeated using four fresh samples until satisfactory performance has been demonstrated. After satisfactory performance has been achieved for all sample analytes, sample analysis may begin.

TABLE 3. SINGLE LABORATORY ACCURACY AND PRECISION DATA FOR VOLATILE ORGANIC COMPOUNDS IN WATER DETERMINED WITH A NARROW-BORE CAPILLARY COLUMN

Analyte	Conc. µg/L	Number of Reps	Rec. %	Standard Deviation of Rec.	% RSD
Benzene	0.1	7	99	6.2	6.3
Bromobenzene	0.5	7	97	7.4	7.6
Bromochloromethane	0.5	7	97	5.8	6.0
Bromodichloromethane	0.1	7	100	4.6	4.6
Bromoform	0.5	7	101	5.4	5.3
Bromomethane	0.5	7	99	7.1	7.2
n-Butylbenzene	0.5	7	94	6.0	6.4
sec-Butylbenzene	0.5	7	110	7.1	6.5
tert-Butylbenzene	0.5	7	110	2.5	2.3
Carbon tetrachloride	0.1	7	108	6.8	6.3
Chlorobenzene	0.1	7	91	5.8	6.4
Chloroethane	0.1	7	100	5.8	5.8
Chloroform	0.1	7	105	3.2	3.0
Chloromethane	0.5	7	101	4.7	4.7
2-Chlorotoluene	0.5	7	99	4.6	4.6
4-Chlorotoluene	0.5	7	96	7.0	7.3
1,2-Dibromo-3-chloropropa	0.5	7	92	10.0	10.9
Dibromochloromethane	0.1	7	99	5.6	5.7
1,2-Dibromoethane	0.5	7	97	5.6	5.8
Dibromomethane	0.5	7	93	5.6	6.0
1,2-Dichlorobenzene	0.1	7	97	3.5	3.6
1,3-Dichlorobenzene	0.1	7	101	6.0	5.9
1,4-Dichlorobenzene	0.1	7	106	6.5	6.1

Dichlorodifluoromethane	0.1	7	99	8.8	8.9
1,1-Dichloroethane		0.5	7	98	6.2 6.3
1,2-Dichloroethane		0.1	7	100	6.3 6.3
1,1-Dichloroethene		0.1	7	95	9.0 9.5
cis-1,2-Dichloroethene	0.1	7	100	3.7	3.7
trans-1,2-Dichloroethene		0.1	7	98	7.2 7.3
1,2-Dichloropropane		0.5	7	96	6.0 6.3
1,3-Dichloropropane		0.5	7	99	5.8 5.9
2,2-Dichloropropane		0.5	7	99	4.9 4.9
1,1-Dichloropropene		0.5	7	102	7.4 7.3
Ethylbenzene		0.5	7	99	5.2 5.3
Hexachlorobutadiene		0.5	7	100	6.7 6.7
Isopropylbenzene	0.5	7	102	6.4	6.3
p-Isopropyltoluene		0.5	7	113	13.0 11.5
Methylene chloride		0.5	7	97	13.0 13.4
Naphthalene		0.5	7	98	7.2 7.3
n-Propylbenzene	0.5	7	99	6.	6.7

TABLE 4.

SURROGATE SPIKE RECOVERY LIMITS FOR WATER AND SOIL/SEDIMENT SAMPLES

Surrogate Compound	Percent Low/High Water	Recovery Low/High Soil/Sediment
4-Bromofluorobenzene	86-115	74-121
Dibromofluoromethane	86-118	80-120
Toluene-d ₈	88-110	81-117
Dichloroethane-d ₄	80-120	80-120

10.1.3 The initial demonstration of capability is used primarily to preclude a laboratory from analyzing unknown samples via a new, unfamiliar method prior to obtaining some experience with it. It is expected that as laboratory personnel gain experience with this method, the quality of data will improve beyond those required here.

10.1.4 Laboratory Reagent Blanks. Each day and after a set of 20 samples, the analyst must analyze a reagent blank to demonstrate that interferences from the analytical system are under control. No concentration of any target analyte should be greater than the analyte's reporting limit. When extracted samples are to be analyzed, it is necessary to analyze a laboratory reagent

blank that undergoes the same procedure as the extracted samples. To accomplish this, clean soil is used, with 5 g. being extracted with 9 ml of methanol, 1 ml of surrogate solution, and 250 µl of the extraction solvent phase being analyzed. The same criteria would apply in that no concentration of any target analyte should be greater than the analyte's reporting limit. Note: This procedure will follow those steps set forth in Section 11.1 for extraction.

10.2 ASSESSING LABORATORY PERFORMANCE - LABORATORY FORTIFIED BLANK

10.2.1 The analyst runs a one-point check sample containing all the VOC's per batch of samples or every twelve hours. The response factors are calculated for each compound and compared to the average response factor in the initial calibration. The percent difference (%D) for each calibration check compound (CCC) response factor must be less than 20%, otherwise corrective action must be taken. The CCCs are as follows: (1) Vinyl Chloride, (2) Chloroform, (3) 1,2-Dichloropropane, (4) Toluene, (5) Ethyl Benzene, and (6) 1,1-Dichloroethene. The minimum response factors for SPCCs must be maintained per the initial calibration criteria (Sec 9.1.4 & 9.1.5). In addition, a medium level LFB must be extracted with each batch of samples undergoing extraction.

10.3 ASSESSING CALIBRATION ACCURACY - LABORATORY CHECK SAMPLE OR REFERENCE STANDARD

Following acceptable performance for the Laboratory Fortified Blank, daily a Reference standard will be analyzed (Sec. 7.5). The reference standard will come from an alternate supplier or lot from the same supplier as the LFB and must pass all of the same criteria as the LFB (Sec. 9.1.4 & 9.1.5). If the Reference standard fails any of the criteria, a new reference is opened and analyzed. If it passes, then sample analysis may begin. If it fails, a new calibration curve is generated.

10.4 ASSESSING ANALYTE RECOVERY - LABORATORY FORTIFIED SAMPLE MATRIX (SPIKE AND SPIKE DUPLICATE)

10.4.1 The laboratory must spike in duplicate and analyze a minimum of 5% of samples to monitor and evaluate laboratory data quality. Table 5 lists the acceptance ranges for the spiking compounds:

Table 5.

ANALYTE	PERCENT RECOVERY		RPD	
	Water	Soil	Water	Soil
1,1-Dichloroethene	61-145	59-172	14	22
Trichloroethene	71-120	62-137	14	24
Benzene	76-127	66-142	11	21
Toluene	76-125	59-139	13	21
Chlorobenzene	75-130	60-133	13	21

where RPD = relative percent difference between replicate analyses defined as follows:

$$RPD = 100 * [(x1 - x2) / \{(x1 + x2)/2\}]$$

where: x1 = Sample result
x2 = Duplicate sample result

10.4.2 Calculate the percent recovery, P, of the concentration for each analyte, after correcting the analytical result, X, from the fortified sample for the background concentration, b, measured in the unfortified sample, i.e.,:

$P = 100(X - b)/\text{fortifying concentration}$,
and compare these values to control limits for the appropriate matrix.

If any analyte fails the accepted criteria, a check standard containing each analyte that fails the criteria is analyzed. If the compound that fails the performance criteria in the spike/spike replicate passes the acceptable criteria for a continuing calibration sample, then the failure is assumed to be matrix dependent and the report is flagged as such. If the compound fails to meet acceptance criteria in the check standard, then the compound is said to be out of control and corrective action must be taken. The results of the sample analysis and the spike/spike duplicate are labelled suspect, may not be reported for regulatory compliance purposes. In addition, a medium level LFM must be extracted with each batch of samples undergoing extraction.

10.5 Surrogate Compounds - The surrogate compounds are spiked into water samples at 10 µg/L and soil samples at 50 µg/kg. Limits are taken from the method.

Table 6.

Surrogate Compound	Water	Soil
	Low/High	Low/High

4-Bromofluorobenzene	86-115	74-121
Dibromofluoromethane	86-118	80-120
Toluene-d8	88-110	81-117

At least annually, calculate the accuracy and precision limits for all surrogate compounds using a minimum of thirty samples. Calculate the control limits for each surrogate as follows:

Upper control limit = $P+3s$

Lower control limit = $P-3s$

10.5.1 If one or more of the surrogates is outside QC limits the sample is reanalyzed. If the second analysis passes, it is reported. If the second analysis also fails QC limits, then the initial analysis is reported and the surrogates are flagged as out of limits due to sample matrix effects.

10.5.2 It is recommended that the laboratory annually determine and document its detection limit capabilities for analytes of interest.

10.5.3 At least quarterly, analyze a QC sample from an outside source.

11.0 PROCEDURE

11.1 SOILS

11.1.1 Low Level Analysis

1. Analysis of soil and sludge samples is accomplished by weighing out a 0.5g - 5.0g of the sample into a glass culture tube, which has a small wadding of clean glass wool in the bottom and adding 5 ml of reagent grade water. When analyzing by 8260B, see Section 8 of the Encore and Archon SOP.
2. The sample is then vortexed for about 5 seconds.
3. Place the sample on the Tekmar 2016/2032.
4. To a 5 ml syringe containing reagent grade water add 10 μ L of internal standard/surrogate solution.
5. Transfer contents of syringe to sample vessel.

6. Install heater pockets and analyze.

11.1.2 Medium and High Level Analysis

1. If sample is determined to have a high concentration of an analyte or analytes, an extraction procedure using methanol and a portion of the sample (between 5g and 0.5g) may be employed as follows. When analyzing by Method 8260B, see Section 8.0 of the Encore and Archon SOP.
 - a) To a 10 ml Class A pipette add 9 ml of methanol.
 - b) To a 20 ml vial weigh out between 0.5g and 5.0 g of sample.
 - c) Immediately add the 9 ml of reagent free methanol (which was determined to be reagent free by adding an aliquot to the LRB analyzed prior to the batch of extracted samples) and 1ml of the Surrogate Spiking Solution and cap.
 - d) Vortex vigorously for 30 seconds. .
 - e) Allow sample to sit until soil precipitates out.
 - f) Place the sample on the Tekmar 2016/2032. Add 5 ul of internal standard solution. Continue with step 6. in Sec 11.1.1.

. 11.2 WATERS

1. To the sites where samples are to be loaded on the Tekmar 2016/2032, place empty tubes.
2. Analysis of water samples is accomplished by transferring 25 ml of sample into a 25 ml syringe and 10 μ L of internal standard/surrogate solution being added to the syringe.
3. Transfer the contents of the syringe to the appropriate vessel site on the Tekmar 2016/2032.
4. Install heater pocket and analyze.
5. Samples that are to be analyzed employing the O/I 4560 will not need to be transferred from the 40 ml VOA vial. Internal standard/surrogate solution is automatically added to the sample.

11.3 GAS CHROMATOGRAPHY

11.3.1 Section 6.4 summarizes the recommended operating conditions for the gas chromatograph.

11.3.2 Calibrate the system daily as described in Section 9.2.

11.3.3 Sample is purged onto VOCARB 3000 trap and desorbed onto GC column. Record the resulting total peak areas in area units.

11.2.4 If the response for the peak exceeds the working range of the system, dilute the extract and reanalyze.

11.4 IDENTIFICATION OF ANALYTES

11.4.1 The following table summarizes the compounds, retention times, and ions used in this method.

Table 7.

TARGET ANALYTE	Retention Time 2 min. window	Primary ion	Secondary ion(s)
Acetone	5.91	58	43
Acrolein	7.63	56	55, 58
Acrylonitrile	5.90	53	52, 51
Allyl chloride	5.49	76	76, 41, 39, 78
Benzene	8.23	78	---
Bromobenzene	15.80	156	77, 158
Bromochloromethane	7.39	128	49, 130
Bromodichloromethane	9.75	83	85, 127
Bromoform	14.85	173	175, 254
Bromomethane	4.12	94	96
2-Butanone	7.07	72	43, 72
n-Butylbenzene	18.49	91	92, 134
sec-Butylbenzene	17.37	105	134
tert-Butylbenzene	16.95	119	91, 134
Carbon disulfide	5.41	76	78
Carbon tetrachloride	7.96	117	119
Chlorobenzene	13.37	112	72, 114
Chlorodibromomethane	12.28	129	208, 206
Chloroethane	4.21	64	66

bis-(2-chloroethyl)sulfide	10.40	109	111, 158, 160
Chloroform	7.45	83	85
Chloromethane	3.61	50	52
2-Chlorotoluene	16.16	91	126
4-Chlorotoluene	16.36	91	126
1,2-Dibromo-3-chloropropane	20.14	75	155, 157
1,2-Dibromoethane	12.50	107	109, 188
1,2-Dichlorobenzene	18.57	146	111, 148
1,3-Dichlorobenzene	17.64	146	111, 148
1,4-Dichlorobenzene	17.81	146	111, 148
trans-1,4-Dichloro-2-butene	15.79	53	88, 75
Dichlorodifluoromethane	3.27	85	87
1,1-Dichloroethane	6.41	63	65, 83
1,2-Dichloroethane	8.21	62	98
1,1-Dichloroethene	5.11	96	61, 63
cis-1,2-Dichloroethene	7.10	96	61, 98
trans-1,2-Dichloroethene	5.94	96	61, 98
Ethylbenzene	13.53	91	106
Ethyl methacrylate	11.34	69	69,41,99,86,114
Hexachlorobutadiene	22.21	225	223,227
2-Hexanone	11.96	43	58, 57, 100
Iodomethane	5.29	142	127, 141
Isobutyl alcohol	8.20	43	43, 41, 42, 74
Isopropylbenzene	15.17	105	120
p-Isopropyltoluene	17.64	41	41,67,39,52,66
Methacrylonitrile	7.34	41	41,67,39,52,66
Methyl methacrylate	9.43	69	69, 41, 100, 39
4-Methyl-2-pentanone	10.60	100	43, 58, 85
Naphthalene	22.40	128	---
Propionitrile (ethyl cyanide)	7.08	54	54, 52, 55, 40
n-Propylbenzene	15.95	91	120
Styrene	14.48	104	78
1,2,3-Trichlorobenzene	22.91	180	182, 145
1,2,4-Trichlorobenzene	21.88	180	182, 145
1,1,1,2-Tetrachloroethane	13.48	131	133, 119
1,1,2,2-Tetrachloroethane	15.69	83	131. 85
Tetrachloroethene	11.90	164	128, 131, 166
Toluene	10.97	92	91
1,1,1-Trichloroethane	7.75	97	99, 61
1,1,2-Trichloroethane	11.56	83	97, 85
Trichloroethene	9.07	95	97, 130, 132

Trichlorofluoromethane	4.51	151	101, 153
1,2,3-Trichloropropane	15.81	75	77
1,2,4-Trimethylbenzene	15.17	105	120
1,3,5-Trimethylbenzene	16.28	105	120
Vinyl acetate	5.91	43	86
Vinyl chloride	3.68	62	64
o-Xylene	14.47	106	91
m-Xylene	14.47	106	91
p-Xylene	13.73	106	91
INTERNAL STANDARDS /SURROGATES			
1,4-Difluorobenzene	8.65	114	---
Chlorobenzene-d ₅	13.31	117	---
1,4-Dichlorobenzene-d ₄	17.75	152	115, 176
4-Bromofluorobenzene	15.44	95	174, 176
Dibromofluoromethane	7.66	113	---
Toluene-d ₈	10.86	98	---
Pentafluorobenzene	7.63	168	---

12.0 Qualitative analysis

- 12.1** The identification of compounds are based on retention times and on comparison of the sample mass spectrum, after background correction, to the spectrum of the standards. With the exception of m and p Xylenes, all structural isomers are separated based upon retention times. Since m and p Xylenes co-elute, they are reported as isomeric pairs.
- 12.2** The relative retention time of the sample component should be within ± 0.06 RRT units of the RRT of the standard component.
- 12.3** The relative intensities of the characteristic ions should agree within 30% of the relative intensities of these ions in the reference spectrum.
- 12.4** The qualifier produced by the RTE-A should be 80 or above.
- 12.5** When a client requests that a TIC (tentatively identified compound) report be performed, the program called HAHA should be used to generate the 20

most abundant peaks in the chromatogram. The following guidelines should be followed when determining which compounds to put on the final report:

12.5.1. Relative intensities of major ions in the reference spectrum (ions >10% of the most abundant ion) should be present in the sample spectrum.

12.5.2 The relative intensities of the major ions should agree within $\pm 20\%$.

12.5.3 Molecular ions present in the reference spectrum should be present in the sample spectrum.

12.5.4 Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.

12.5.5 Structural isomers that produce very similar mass spectra should be identified as individual isomers if they have sufficiently different GC retention times. Sufficient GC resolution is achieved if the height of the valley between two isomer peaks is less than 25% of the sum of the two peak heights. Otherwise, structural isomers are identified as isomeric pairs.

13.0 Quantitative analysis

13.1.1 When a compound has been identified, the quantitation of that compound will be based on the integrated abundance from the EICP of the primary characteristic ion. Quantitation will take place using the internal standard technique. The internal standard used shall be the one nearest the retention time of that of a given analyte (e.g. see Table 7).

13.1.2 When linearity exists, as per Sec. 9.1.5, calculate the concentration of each identified analyte in the sample as follows:

$$\text{Concentration } (\mu\text{g/l}) = \frac{(A_x) (I_s)}{(A_{is}) (RF) (V_o)}$$

where :

A_x = Area of characteristic ion for compound being measured.

- I_s = Amount of internal standard injected (ng).
- A_{is} = Area of characteristic ion for the internal standard.
- RF = Mean relative response factor for compound being measured (Sec. 9.1.3).
- V_o = Volume of water purged (mL), taking into consideration any dilutions made.

Sediment/Soil Sludge (on a dry-weight basis) and Waste (normally on a wet-weight basis)

$$\text{Concentration } (\mu\text{g/kg}) = \frac{(A_x)(I_s)(V_t)}{(A_{is})(\text{RF})(V_i)(W_s)(D)}$$

where:

- $A_x, I_s, A_{is}, \text{RF},$ = Same as for water.
- V_t = Volume of total extract (μl) (USE 10,000 μl or a factor of this when dilutions are made).
- V_i = Volume of extract added (μl) for purging.
- W_s = Weight of sample extracted or purged (g).
- D = % dry weight of sample/100, or 1 for a wet-weight basis.

Where % solids = [(dry weight) / (wet weight)] * 100

13.1.3 Where applicable, an estimate of concentration for noncalibrated components in the sample should be made. The formulas given above should be used with the following modifications: The areas A_x and A_{is} should be from the total ion chromatograms and the RF for the compound should be assumed to be 1. The concentration obtained should be reported indicating (1) that the value is an estimate and (2) which internal standard was used to determine concentration. Use the nearest internal standard free of interferences.

13.1.4 Alternatively, the regression line fitted to the initial calibration may be used for determination of analyte concentration.

14.0 Waste Disposal

All waste disposal is handled according to the Aqua Tech Environmental Laboratories chemical hygiene plan for waste disposal.

15.0 REFERENCES

Method 8260A, "Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) Capillary Column Technique." Revision 1. November, 1992.



Roy F. Weston, Inc.
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610-701-3000
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FACSIMILE TRANSMITTAL
Building 5-2 (Geosciences)
FAX 610-701-7401

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KEN BARDO

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STANDARD OPERATING PROCEDURE

SOIL SAMPLING USING THE ENCORE SOIL SAMPLER AND THE ARCHON PURGE AND TRAP AUTOSAMPLER SYSTEM

1.0 SCOPE AND APPLICATION

This method covers the sampling procedure using the Encore Soil Sampler and the associated procedures for the Archon Autosampler.

2.0 SUMMARY OF METHOD

Three 5 gram Encore samplers are sent to the site for collection of each sample. One soil jar is also filled for each sample for use in determining the dry weight of the sample. In the field, the samplers are filled with soil and capped. The samplers are then shipped to the lab within 48 hours. After arriving at the laboratory, the sample is either analyzed immediately (if it is still within 48 hours of collecting the sample) or it is preserved with sodium bisulfate. The Archon autosampler is used as the purge and trap device and the sample is then analyzed by method 8260.

3.0 INTERFERENCES

Method interferences may be caused by contaminants in solvents, reagents, glassware, and other sample processing hardware that lead to discrete artifacts and/or elevated baselines in the chromatograms. All of these materials must be routinely demonstrated to be free from interferences under the conditions of the analysis by running laboratory reagent blanks.

Also, note that all the analytes listed in the scope are mixtures of a variety of organic compounds and therefore, any number of compounds could interfere positively with the results. The extent of matrix interferences will vary considerably from source to source, depending upon the matrix sampled. Further processing of sample extracts may be necessary.

4.0 SAFETY

The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined; however, each chemical should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material safety data sheets should also be made available to all personnel involved in the chemical analysis.

5.0 APPARATUS AND EQUIPMENT

5.1 SAMPLE BOTTLE -- Waters - Borosilicate, 40 ml volume, fitted with screw caps lined with TFE-fluorocarbon. Soils - Borosilicate, 8 ounce, fitted with screw caps lined with TFE-fluorocarbon.

5.2 Encore Soil Sampler -- 5 g or 25 g

5.3 Archon Purge and Trap Autosampler System

5.4 GLASSWARE

5.4.1 Microsyringes -- 5 μ L, 10 μ L, 25 μ L, 100 μ L, 250 μ L, 500 μ L, and 1,000 μ L. These syringes should be equipped with a 20 gauge (0.006 in. ID) needle having a length sufficient to extend from the sample inlet to within 1 cm of the glass fill in the purging device. The needle length will depend upon the dimensions of the purging device employed.

5.4.2 Syringes -- 5 mL and 25 mL, gas-tight with shutoff valve.
5 μ L, 10 μ L Hamilton syringes

5.4.3 Vortex -- Used to slurry soil samples and methanolic extracts.

5.4.4 Volumetric flasks, Class A -- 10 mL and 100 mL, with ground glass stoppers.

5.4.5 Spatula -- Stainless steel.

5.4.6 Disposable pipets -- Pasteur.

5.5 BALANCE -- Top Loading, capable of accurately weighing to the nearest 0.01 g.

6.0 REAGENTS

- 6.1 Methanol -- Distilled-in-glass quality or equivalent.
- 6.2 Reagent water -- Reagent water is defined as a water that is reasonably free of contamination that would prevent the determination of any analyte of interest. A reverse osmosis system is used in the lab.
- 6.3 Gases -- The helium gas used as a carrier and for purging is 99.999% ultra high purity and halogen free. It is purchased from AGA.

7.0 SAMPLE COLLECTION, PRESERVATION AND HANDLING

For each soil sample, three Encore samplers must be filled. The sampler is removed from the package and the handle is attached. Each of the three 5 g samples are collected quickly using the Encore sampler. The caps are attached and the labels are filled out and attached to each sampler. A soil jar is filled with sample and labelled. This is used to determine dry weight in the lab. The samples are placed on ice and shipped to the lab.

Note: Sampling on Friday requires prior approval from the laboratory, since samples must be sent overnight for Saturday delivery. The analyst must either analyze or preserve all samples (collected on a Friday) either on Saturday or Sunday because of the 48 hour hold time.

8.0 PROCEDURE

When the samples arrive at the laboratory, the following procedure is used to prepare them for analysis: A 40 ml vial is used as the sample vessel. Five gram of sodium bisulfate is added to the vial as a preservative, along with a stir bar. The vial, preservative and stir bar are tared. The contents of the first 5 gram Encore sampler is placed into the vial and the weight of the soil is recorded. Five ml of water is added to the vial and the vial is vortexed for approximately 2 minutes. The vial is placed on the Archon autosampler for analysis.

The second Encore sampler is treated as follows: Place 5 gram of sodium bisulfate into another vial and tare. Place the contents of the second Encore sampler into the vial and

record the weight of the sample. This vial should be refrigerated at 4°C away from light up to 14 days for soils when stored under these conditions.

The third Encore sampler is used as the extract. Tare a 40 ml vial. Place the contents of the Encore sampler into the vial and record the weight of the sample. Add to the vial approximately the same amount of methanol as is the weight of the sample. For example, if the weight of the sample is 5 grams, add 5 ml of methanol. Store this vial at 4°C for up to 14 days to use for the high level analysis. The high level methanol extract is used if the low level analysis shows that the concentration of the sample is over 200 ppb. If the methanol extract is needed, a stir bar is placed into the vial and it is vortexed and then analyzed.

After the sample is prepared, it is placed on the rack in the Archon Autosampler. The Archon autosampler is programmed at the keypad according to the following table.

an aliquot of methanol from the third vial is taken and put into another vial containing ~10 ml of water & a stir bar

CS
4-19-94

Table 1. Settings for the Archon Autosampler

Sample Type:	Soil
First Vial:	1
Last Vial:	Last vial in rack
Sample Volume:	5 ml
# Rinses:	0
Standard 1	No
Standard 2	Yes
S PreHeat Stir	No
Stir	Yes
W Stir Time	0
W Settle Time	0
Syringe Flushes	0
PreHeat	Yes
PreHeat Temp	40
PreHeat Time	2
Purge Time (min.)	9.5
Desorb Time (min.)	2.5
Operate Mode	Remote
Cycle Timer	0 min.
Aux. Timer	0
Lnk to Method	3

After establishing these run conditions, the sequence is written according to method 8260. The samples are then analyzed by method 8260.

9.0 QUALITY CONTROL

Minimum quality control (QC) requirements are initial demonstration of laboratory capability, and an MDL. All other quality control requirements are done according to method 8260.

9.1 Initial Demonstration of Capability

9.1.1 The analyst must make an initial, one-time, demonstration of capability to generate acceptable accuracy and precision with this method. Analyze four 25 ml aliquots of a well mixed QC check sample which contains each analyte at a concentration of 20 ug/L or less, and calculate the average recovery and the standard deviation of each analyte.

9.1.2 For each analyte the recovery value for all four of these samples results are comparable if the calculated standard deviation of the recovery does not exceed 2.6 times the single laboratory RSD or 20%, whichever is greater, and the mean recovery lies within the interval $\bar{x} \pm 3s$ or $\bar{x} \pm 30\%$, whichever is greater. For those compounds that meet the acceptance criteria, performance is considered acceptable. For those compounds that fail these criteria, this procedure must be repeated using four fresh samples until satisfactory performance has been demonstrated. After satisfactory performance has been achieved for all sample analytes, sample analysis may begin.

9.1.3 The initial demonstration of capability is used primarily to preclude a laboratory from analyzing unknown samples via a new, unfamiliar method prior to obtaining some experience with it. It is expected that as laboratory personnel gain experience with this method, the quality of data will improve beyond those required here.

14.0 Waste Disposal

All waste disposal is handled according to the Aqua Tech Environmental Laboratories chemical hygiene plan for waste disposal.

**RESPONSE TO COMMENTS RECEIVED FROM EPA
ON 4 AUGUST 2000**

**ATTACHMENT 6
Draft 1999 Groundwater Monitoring Report
Corrected Table 4-1**

Table 4-1

**Summary of Water Level Data Collected
During the 1999 Groundwater Sampling Program**

		15 February 1999		24 August 1999	
Measurement Location	Measurement Point Elevation	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation
I-2	946.4	31.57	914.83	34.43	911.97
I-4	933.23	18.53	914.70	21.41	911.82
I-5	946.13	30.83	915.30	33.44	912.69
I-6	940.62	23.26	917.36	25.71	914.91
I-7	940.04	23.52	916.52	26.13	913.91
I-8	931.51	7.68	923.83	*	*
I-8D	933.46	17.82	915.64	*	*
I-9	932.17	*	*	*	*
I-10	935.79	10.49	925.30	10.97	924.82
I-11	933.79	22.88	910.91	26.38	907.41
I-12	944.54	26.35	918.19	30.35	914.19
I-13	933.47	26.73	906.74	27.41	906.06
I-14	932.33	27.52	904.81	27.89	904.44
R-1	946.91	57.71	889.20	46.84	900.07
R-2	946.32	59.02	887.30	46.41	899.91
R-3	947.14	57.95	889.19	42.99	904.15
R-4	933.28	21.12	912.16	22.44	910.84
R-5	937.78	31.25	906.53	30.74	907.04
R-7	941.55	36.64	904.91	32.21	909.34
R-10	935.8	38.44	897.36	38.91	896.89
R-12	945.35	36.51	908.84	*	*
S-4	934.88	10.88	924.00	11.26	923.62
S-7	940.94	18.14	922.80	20.41	920.53
S-11	934.04	8.88	925.16	11.48	922.56
S-12	944.93	20.14	924.79	*	*
W-1	947.62	123.0**	824.6**	*	*

Table 4-1

Summary of Water Level Data Collected
During the 1999 Groundwater Sampling Program
(Continued)

		15 February 1999		24 August 1999	
Measurement Location	Measurement Point Elevation	Depth to Water	Groundwater Elevation	Depth to Water	Groundwater Elevation
W-2	945.29	*	*	*	*
W-10	945.79	94.13	851.66	101.30	844.49
P-3	933.68	9.97	923.71	*	*
P-4	938.49	*	*	*	*
P-5	948.43	21.13	927.30	24.38	924.05
L-1	946.33	25.26	921.07	31.90	914.43
L-2	947.57	13.82	933.75	19.81	927.76
L-3	946.91	12.52	934.39	14.62	932.29
L-4	938.22	6.44	931.78	6.78	931.44
L-5	936.98	7.07	929.91	7.49	929.49
SG-5	939.19	11.58	927.61	12.39	926.80

* Unable to access the well.

**Water level measured 25 February 1999.

EH1 - 186

September 15, 2000

DE-9J

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RETURN RECEIPT REQUESTED

Mr. Matthew Basso
Manager, Environmental Affairs
American Home Products Corporation
One Campus Drive
Parsippany, New Jersey 07054

RE: Response to Comments on U.S. EPA's
QAPP Approval with Modifications
EKCO Housewares, Inc.
OHD 045 205 424

Dear Mr. Burman:

The United States Environmental Protection Agency (U.S. EPA) has completed a review of your August 30, 2000 letter and the September 6, 2000 submittal (Attachments 1 through 6) from Roy F. Weston, Inc. regarding the EKCO facility in Massillon, Ohio. Attachment 5 of the September 6, 2000 submittal was supplemented on September 14, 2000. The submittals were in response to U.S. EPA's approval with modifications on August 4, 2000 of the Geoprobe Soil Sampling Quality Assurance Project Plan (QAPP).

Your letter provides the reasons for eliminating U.S. EPA's addition of tetrachloroethylene and vinyl chloride parameters to the list of soil cleanup goals. The soil screening parameters to be investigated in the proposed study would include trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), 1,2-dichloroethylene (1,2-DCE), and 1,1,1-trichloroethane (1,1,1-TCA). U.S. EPA concurs with your request based on current information and will use soils data for TCE, 1,1-DCE, 1,2-DCE, and 1,1,1-TCA concentrations in soils to determine whether the proposed soil vapor extraction is necessary to protect human health and the environment.

Regarding the responses and revisions to the QAPP provided in Roy F. Weston's September 6, 2000, and September 14, 2000 submittals, the U.S. EPA finds that the QAPP revisions discussed and provided in Attachments 2 through 5 generally address

U.S. EPA's August 4, 2000 approval with modifications of the QAPP. Enclosed is information that further clarifies the soil sampling and analysis procedures that need to be implemented during the proposed study.

If you have any questions regarding this matter, please contact me at (312) 886-7566.

Sincerely yours,

Kenneth S. Bardo
Corrective Action Section

Enclosure

cc: Jeffrey Burman, EKCO Housewares, Inc.
C. Richard Springer, Borden, Inc.
Thomas Cornuet, Roy F. Weston, Inc.
Karen Nesbit, Ohio EPA

DE-9J:KBARDO:6-7566:kb:09/15/00

EKCO VOC Response to Comments

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ENCLOSURE

1) The EnCore sampler is not intended to hold soil samples greater than 48 hours. All soil samples obtained using the EnCore sampler must be preserved at 4°C and either analyzed or further preserved within 48 hours of sampling. If not analyzed within 48 hours, further preservation for high level analysis requires methanol and low level analysis requires sodium bisulfate for non-carbonate soils or Type II organic free water for carbonate-bearing soils.

For the proposed soil sampling program, it is U.S. EPA's understanding that VOC analysis is expected to be performed within 48 hours of sampling. However, if reanalysis is required (e.g., if low level analysis shows VOC concentrations greater than 200 ppb), preservation of the remaining EnCore samples is necessary unless the reanalysis also occurs within 48 hours of sampling.

If preservation with sodium bisulfate for low level analysis is necessary, U.S. EPA requires that the soil sample be observed for effervescence upon the addition of sodium bisulfate. This is best performed in the field. For each soil sample selected for analysis of VOCs, an aliquot of 5 grams of soil should be placed in a clean VOA vial with 1 gram of sodium bisulfate and 5 ml of deionized water. The vial is sealed and then observed for effervescence. If effervescence is noted, it should be clearly noted on the chain-of-custody form for each applicable sample, and the laboratory must preserve the low level analysis samples with Type II organic free water and storage at -10°C or below. When freezing VOC samples preserved with Type II organic free water, the VOA vials must be positioned at an angle to allow for the expansion of water as it freezes. The laboratory has 14 days from receipt to analyze VOC samples preserved with methanol or sodium bisulfate and 12 days for samples preserved with Type II organic free water.

2) The EnCore SOP for Aqua Tech Environmental Laboratories states in Section 8.0 that 5 grams of sodium bisulfate is placed in two of the EnCore soil samples (for low level analysis). Method 5035 low level analysis requires that the sodium bisulfate preservative solution added to the soil sample consist of 1 gram (not 5 grams) of sodium bisulfate and 5 ml of reagent water (and added to reduce the soil pH to less than 2). Ensure that Aqua Tech Environmental Laboratories adds the correct amount of sodium bisulfate to all soil samples preserved for low level analysis.

EH1 - 187



Roy F. Weston, Inc.
1400 Weston Way
P.O. Box 2653
West Chester, Pennsylvania 19380
610-701-3000 • Fax 610-701-3186
www.rfweston.com

22 November 2000

Mr. Kenneth Bardo
Project Manager
United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3590

Re: EKCO, Massillon, Ohio
World Kitchen Facility Soil Investigation Report

Dear Mr. Bardo:

On behalf of our client, American Home Products Corporation (AHPC), please find attached one copy of the Soil Investigation Report for the EKCO World Kitchen facility in Massillon, Ohio. This report presents the results of the Geoprobe® soil sampling conducted at the site during the week of 18 September 2000. The report also presents a comparison of the September 2000 sampling results with results of samples collected at the site in 1988 and 1991.

Data collection and laboratory analysis procedures were conducted in accordance with the Standard Operating Procedures and Quality Assurance Project Plan Addendum, submitted to the U.S. EPA on 6 September 2000 and subsequently approved by the U.S. EPA on 15 September 2000. Tables and figures, which present the analytical data and show in bold those concentrations that exceed calculated soil cleanup goals, are included in the report. A detailed geologic log with field screening and percent recovery data for each soil boring, and a certificate of analysis for each soil sample are included in the appendices of the report.

You may contact me at (610) 701-7360 or Mr. Matthew Basso at (973) 683-2273, if you have any questions or comments regarding this submittal. After you have reviewed the report, we would like to schedule a meeting with you so that we can discuss the recent soil sampling effort.

Very truly yours,

ROY F. WESTON, INC.

Thomas Cornuet, P.G.
Project Manager

Attachment

cc: M. Basso, AHPC (w/attachment)
G. Smith, AHPC (w/attachment)
J. Burman, EKCO (w/attachment)
R. Springer, Borden (w/attachment)
L. Bove, WESTON (w/o attachment)
D. Cairns, WESTON (w/attachment)



cc: Jeffrey Burman, EKO Housewares, Inc.
 C. Richard Springer, Borden, Inc.
 Thomas Cornuet, Roy F. Weston, Inc.
 Karen Nesbit, Ohio EPA

DE-9J:KBARDO:6-7566:kb:12/11/00

EKO Soils Report

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ENCLOSURE 1

1. **Page 2:** Recalculated soil cleanup goals are provided. These soil cleanup goals are the performance standard to be met to remediate contaminated soils and protect groundwater. In addition to these soil cleanup goals, U.S. EPA, Region 5 has established industrial soil preliminary remediation goals (PRGs) to protect human health. The PRGs are based on conservative carcinogenic and non-carcinogenic risks associated with inhalation, dermal contact, and ingestion of soil contaminants. For the EKCO facility, the pertinent PRGs are:

1,1-DCE	120 $\mu\text{g/kg}$
cis-1,2-DCE	150,000 $\mu\text{g/kg}$
trans-1,2-DCE	210,000 $\mu\text{g/kg}$
1,1,1-TCA	1,400,000 $\mu\text{g/kg}$
TCE	6,100 $\mu\text{g/kg}$

The September 2000 data shows that the industrial soil PRG for TCE is exceeded at sample locations SB-02-00 (2' and 7' depth), SB-09-00 (10' depth), SB-13-00 (1.3', 5', and 9' depth), SB-14-00 (1' and 19.5' depth), SB-16-00 (7.5' depth), and SB-17-00 (6' depth). The industrial soil PRG for 1,1-DCE is exceeded at sample location SB-11-00 (14' depth), SB-12-00 (2' depth), SB-13-00 (9' depth), and SB-14-00 (10.5' and 15' depth).

Four of the soil sample locations (SB-11-00 through SB-14-00) where industrial soil PRGs are exceeded are located under the concrete floor of the manufacturing building. The four remaining soil sample locations (SB-02-00, SB-09-00, SB-16-00, and SB-17-00) are located in grassy areas along the west side of the building and east of the northeast corner of the building.

Ensuring that current human exposures are under control is an important indicator of the environmental quality at the facility. EKCO needs to evaluate and determine whether:

- 1) there are complete pathways between the contamination and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions;
- 2) exposures from any of the complete pathways can be reasonably expected to be significant; and
- 3) significant exposures can be shown to be within acceptable limits.

The attached checklist (Enclosure 2) can be consulted to aid in this evaluation and determination.

2. **Page 4:** In the first paragraph, it appears that the reference to boring SB-18-00 should be modified to read "SB-02-00".
3. **Page 7:** The first full paragraph is confusing. Boring locations SB-07-00 and SB-08-00 are discussed as being in the North Area - Outside but they are located in the Southwest Area. The paragraph should be modified to discuss boring locations SB-03-00 through SB-06-00.
4. **Page 8:** Based on the report and U.S. EPA comments and modifications, U.S. EPA concludes that:
 - Soil concentrations of TCE, 1,1-DCE, 1,2-DCE, and 1,1,1-TCA have generally increased beneath the building (North Area - Inside) in the vicinity of the former TCE spill. Increased concentrations may be a reflection of the new VOCs in soils sampling method used which is expected to be more representative of the actual contaminant conditions in soil.
 - Soil concentrations of TCE along the west side (West Area) and southwest corner (Southwest Area) of the building are generally the same or have decreased.
 - Soil concentrations of TCE in the vicinity of SB-01-00 and SB-02-00, located approximately 150' east of the northeast corner of the building (new Northeast Area) have increased. The potential source of contamination in this area has not been identified.
 - Soil cleanup goals for addressing groundwater contamination are currently exceeded in four areas: 1) North Area - Inside; 2) West Area; 3) Southwest Area; and 4) the new Northeast Area. These areas are not the same as previously identified (see Appendix 2, Figure 5-3 of the report). Soil vapor extraction is necessary in these areas to remediate soils and expedite the cleanup of groundwater.
 - Industrial soil PRGs are exceeded for TCE and 1,1-DCE under the building (North Area - Inside) and for TCE in the West, Southwest and new Northeast Areas. EKCO needs to address these exceedances through remediation, institutional controls, and/or site-specific risk assessment.

5. EKCO needs to revise the CMS to address any changes that the recent September 2000 soil data causes in the proposed final remedy. For example, contaminated soil areas that require SVE remediation should be updated and the actions needed to control current human exposures should be identified.

ENCLOSURE 2

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: _____

Facility Address: _____

Facility EPA ID #: _____

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

_____ If yes - check here and continue with #2 below.

_____ If no - re-evaluate existing data, or

_____ if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions **ONLY**, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database **ONLY** as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "**contaminated**"¹ above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater				
Air (indoors) ²				
Surface Soil (e.g., <2 ft)				
Surface Water				
Sediment				
Subsurf. Soil (e.g., >2 ft)				
Air (outdoors)				

_____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

_____ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

¹ "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

Summary Exposure Pathway Evaluation Table

Potential Human Receptors (Under Current Conditions)

<u>"Contaminated" Media</u>	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	—	—	—	—			—
Air (indoors)	—	—	—				
Soil (surface, e.g., <2 ft)	—	—	—	—	—	—	—
Surface Water	—	—			—	—	—
Sediment	—	—			—	—	—
Soil (subsurface e.g., >2 ft)				—			—
Air (outdoors)	—	—	—	—	—		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated" as identified in #2 above.
2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

_____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

_____ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be "significant"⁴ (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

⁴ If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

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5. Can the "significant" exposures (identified in #4) be shown to be within acceptable limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):